# Grasshopper Green's Garden



Julia Augusta Schwartz




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"HE WAS A REAL BUTTERFLY NOW, IN A GARDEN WORLD OF LEAVES."

[*Frontispiece. See p.* 88

# GRASSHOPPER GREEN'S GARDEN

## THE STORY OF SOME WONDERFUL LITTLE LIVES

*A Nature Reader for Elementary Schools*

By

JULIA AUGUSTA SCHWARTZ

Author of "Wilderness Babies," etc.

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# I

# THE LUCKY LITTLE GRASS-HOPPER

# WONDERFUL LITTLE LIVES

## I

## THE LUCKY LITTLE GRASSHOPPER

### I. GRASSHOPPER GREEN LEARNS TO JUMP

THERE was once a beautiful garden, and in the garden grew all sorts of delightful things. Blackberry vines spread in a tangle over the stone wall. An old apple tree stood beside a summer-house covered with climbing roses. A row of currant bushes stretched along the grape arbor. Violets and hepaticas bloomed beneath the cherry trees. Peach trees lifted their low branches in sheltered corners. Lilacs bordered the gravel paths, and peonies

were planted here and there on the sunny lawn.

But trees and flowers were not the only delightful things that grew in the garden. Ah, no, indeed! This garden was the home of many wonderful little creatures. Butterflies hovered over the flowers. Bees hummed about the blossoming fruit trees. Ants hurried to and fro around their brown hills at the edge of the path, and pretty spiders with glistening eyes spun their silken webs from leaf to leaf.

Filmy-winged mosquitoes flitted out at twilight. Now and then a fly on its way to the cottage at one end of the garden rested for a moment on a budding twig. A fat toad blinked solemnly out from its hole under a stone. A nestful of young birds twittered in every tree overhead, and in the ground under foot hundreds of earthworms patiently burrowed their way hither and thither, making fresh soil for the garden.

Oh, this garden was a pleasant place in

the gay spring weather, when Grasshopper Green came there to live! Now where do you suppose he came from? He came right up out of the ground.

All night long the warm spring rain had been falling gently. It trickled over the young leaves on the trees. It sent tiny beads of water rolling down the new blades of grass, and it soaked into the loose brown soil of the freshly spaded flower-beds.

Before dawn the clouds drifted away, leaving the sky clear blue. When the sun rose, it twinkled upon many a new little leaf that had uncurled during the night. The grass had grown longer. The cherry trees had budded. The violets were almost in bloom. Here and there, in the brown beds, the stem of a seedling was pulling its tip of folded leaflets from the soil.

On the lawn beyond the path a robin redbreast was hunting for earthworms. He cocked his head on one side and stood still for a moment, with his bright eyes searching the ground. Then he gave a quick

little run across the grass and darted his beak down to catch a mouthful of breakfast.

Presently he scuttled across to the lettuce bed, and braced himself to drag out a worm that had hooked its tail bristles into the top of its burrow. It was lucky that he had his back to the path, and could not see something that began to stir at the edge of the gravel.

Something alive was pushing up from under the ground. It was not a plant, because a plant either comes pricking straight through with the pointed tip of its rolled up leaves, like a spear of corn, or else it heaves up its humped stem slowly and steadily, as a bean seedling does. But this was different. A bit of the hard soil rose slowly in a tiny arch and then suddenly cracked open. Out of the crack peered two round eyes in a funny little face. It was a baby grasshopper.

The mother grasshopper had laid her eggs just under the surface of the soil the

autumn before. Now, when the warm spring days had come, her babies began to



hatch out and push blindly up toward the air and light.

This lively fellow kicked his way out, waved the two thread-like feelers in front of his eyes, lifted his two front legs to wipe

the dirt from his face, shook his two middle legs clean, and scraped his two hind legs over his back. Then he started out to see the world.

As I have told you before, it was lucky for him that the robin was so busy swallowing the worm that he did not pay any attention to the newcomer. All birds are fond of grasshoppers for breakfast — or for dinner or any other meal, doubtless.

After resting a moment to breathe the air into his wee body, the young grasshopper began to walk forward with all six of his legs till he reached the grassy border of the lettuce bed. Of course he was looking for something to eat; that is what every baby wants the very first thing. When his feelers touched the nearest blade of grass, he gave them a twitch and went climbing straight up the stem.

Now how do you suppose he could do that without slipping down? It was because each of his feet had two claws, and between the two claws was a flat little pad

fringed with hairs. When he climbed up the grass blade, he stuck his claws into it. From the tip of every hair on each pad oozed a drop of sticky stuff that fastened his foot firm till he was ready to lift it to take another step.

So up the grass he walked, and began to eat. His mouth was on the under side of his big little head, ready to bite off and chew whatever he found good to eat. The most convenient thing to eat was the very grass on which he was standing. He opened his strong little jaws, took a bite and chewed it fine and swallowed it.

He kept on biting out pieces and chewing them up fine and swallowing them till he had eaten a scallop out of the edge of the leaf. Then he walked on farther and bit out another scallop. He was having the best kind of a time, with his jaws going chump, chump, chump. The more he ate, the sooner he would grow to be a big grasshopper with wings as well as legs. Even as a baby he looked a good deal like his

father, except that he was so much smaller and had no wings at all.

When evening came, he swung around underneath the blade of grass and glued his feet fast so that he might not fall off while he was asleep. Early in the morning he woke up slowly, but he did not move for quite a while. The cool air made him feel stiff at first. Or it may be that his wee jaws ached somewhat after his busy chewing of the day before.

By and by, as the sun's rays became warmer, he stirred drowsily and stretched out his long hind legs, combing one with the other. Yes, indeed, he could really use them like combs, for the longest slender joint of each one had a row of sharp spines like the teeth of a comb. He could rub them over his small green body too, brushing off every speck of dust. They were remarkable legs. Only fancy! As soon as he grew up, he would be able to sing with them. But best and most important of all to him was their power of jumping. Lit-

tle Grasshopper Green was the champion jumper of the whole garden.

However on this particular morning he did not yet know that he could jump. He had never even tried it. He just went crawling over the grass-blade step by step, with his hind legs folded so that the knees hunched high above his back. His knees bent in the opposite direction from the way ours do. His knees were the best kind for him, and ours are the best kind for us.

When he reached the tip of the leaf he drew both legs close to his body and then suddenly straightened them out. Away he went flying through the air as if he had been shot from a spring-board.

That must have been surprising. He landed with a bump right in the middle of the lettuce bed. It may be that the jar made him a bit dizzy at first. As soon as his head felt steady again, he found a tender young lettuce plant just under his mouth. He opened his jaws and took a

big bite. Oh! but it tasted delicious. So he ate and ate till he ate it all up, 'way down to the ground.

Then he hunted for another plant, and ate that too. Some of his many brothers and sisters were already eating the lettuce. There was hardly enough to go around, for the plants had not had time to grow much yet. Before long every bit of green leaf had been eaten up by the hungry small creatures.

When Grasshopper Green could not find another bite anywhere near, he drew up his hind legs close to his body, and then quickly straightened them out. Away he sailed through the air again. This time he came down ker-plunk on a hard pebble in the middle of the garden path. If he had held his legs stiff and straight, instead of bending them at their limber joints, he might have broken a pair or two. You know how it shakes you up and down your spine if you land without bending your knees after taking a jump. You have to

be taught how to jump in the right way, but the grasshopper knew how from the very first day of his life.

After touching the pebble with his feelers and deciding that it was not good to eat, he jumped again. This time, though he jumped in the right way, he came down in the wrong place. Oh, it was about the most dangerous spot for him in the whole garden. It was right in front of a hen that had flown over the wall and was scratching in the path.

There was a surprised cluck followed by a whirr of feathers and a scamper of two stout feet. Her wide yellow beak came swooping downward. He did not stop to think. He did not know who she was or what she wanted, for he had never met a hen before. But he felt the rush of air as she scuttled toward him, and he drew up his legs exactly in time, because somehow he thought that he had better be going. Away he shot over her head just as her beak snapped shut on a mouthful of

gravel snatched from the spot where he had been standing half a moment before.

### II. GRASSHOPPER GREEN LEARNS TO FLY

Soon after this narrow escape, a strange thing happened. This was the way of it. He kept on eating and eating and eating, and the more he ate, the fatter he grew. The fatter he grew, the tighter his skin seemed. The skin of an insect is made of horny stuff that never grows after it once hardens on the outside of its small owner. Naturally the bigger he grew inside his skin, the more pinched and uncomfortable he felt. Finally — what do you suppose? — his skin cracked and split open. He crawled outside of his own skin and pushed it off all his legs. There he was in a soft new skin that had been growing underneath the old one.

The new skin was bright and fresh, and plenty big enough to fit without squeezing him. He waited a few minutes till it had hardened in the air, because it was danger-

ous for him to go out to eat while his skin was still soft. If he had done that, he might have hurt himself by bumping against a stick or a stone. Or a sharp tip of a grass blade might have pricked clear through his body when he came down after a long jump. He never knew where he would land.

He wore this new skin till he grew too big for it. Then it split as the first had done, and he crawled out in a newer, larger suit. He kept on in this way for two or three months till he was entirely grown up. Meanwhile he had changed his skin five or six times. After the first change, his wings began to grow. Each new skin had larger wings, till at last they were big enough to use in flying. His body was grayish green, and his wings were brown.

Ah, but that was delightful! It was better than jumping. The first time he tried them, perhaps he meant only to jump. He drew up his long hind legs and straightened them out as usual. When he was high

in the air, somehow his wings spread open and away he went whirring for the longest jump he ever had taken yet.

He really had two pairs of wings. One pair were straight and stiff and hard. While he was flying, this pair were spread out and hooked so that they would stay open. Beneath them were two gauzy wings. He flew with these, beating them to and fro very fast. When he stopped moving them, they folded up like fans close to his body. The two stiff wings unhooked and shut down close over the flying wings. These wing-covers, as they are called, kept the gauzy wings from getting scratched and torn.

One summer afternoon, when the garden lay drowsing in the sunshine and even the birds were quiet among the branches overhead, suddenly the young grasshopper began to sing. Shrill and loud his song rose in the stillness, — fizz, fizz, fizz! Then it stopped all at once. Maybe he was astonished at himself. He did not sing from his

mouth and throat. He was only standing in a tuft of grass and rubbing the broad joint of his long hind legs against the edge of his folded wing-covers. He may have been lonely there all by himself. He sang so that some other grasshopper might know where to find him.

But his song was so loud that something else heard him too. A bird darted down from the boughs of a maple tree and fluttered above the spot where Grasshopper Green was singing. She wanted to catch him to feed to her nestful of hungry young ones. She went hopping around, hunting for him.

Grasshopper Green saw her shadow flitting hither and thither. He could hear the rustle of her wings and the patter of her feet. He stopped singing and sat so still that he seemed like a bit of wood or grass himself. Perhaps she would not notice him, for a bird cannot see motionless things nearly so well as those that are moving.

But nearer and nearer she hopped, now

pecking at a twig, now twitching at a leaf, now cocking her head to look under a drooping blade of green. Tap, tap, tap! She was hammering at a pebble wedged among the roots of the sod. A small spider ran from beneath it and scampered farther into the fairy wilderness of tall thick grasses where the grasshopper was hiding. Mother Bird darted after him, stretching out her neck and opening her bill.

Grasshopper Green heard her coming. He was so frightened that he could not keep still another instant. He drew up his legs suddenly. Ah! she had spied him. That small ridged bump there was not a twig at all. It was a fat, delicious little grasshopper. Forgetting about the fleeing many-legged brown spider, she made a swift dash toward the juicy morsel within easy reach.

Snap! She had missed him as he jumped. But a moment later she was flying after him. Swoop! She had caught him by the tip of one whirring wing. Flap, flap, flap!

he beat the other to and fro as he twisted and squirmed to get free. It was lucky for him that these gauzy wings were so delicate and easily torn. Before Mother Bird could seize a firmer grip, the sharp edges of her beak had snipped through the frail bit of gauze. Down dropped Grasshopper Green to the ground and quickly slid under a leaf to hide.

Just then the biggest baby bird in the nest in the maple gave such a shrill peep that his mother flew home as fast as she could to see what was the matter. Really the only trouble was that the little fellow thought he was starving and could not wait another minute for something to eat. It would have been better for him if he had kept quiet a moment longer till his mother had caught the grasshopper. Now, after losing so much time, she could not find him, though she hunted under every leaf near the spot where he had dropped. He had already taken a fresh jump upward and gone sailing away toward the row of cur-

rant bushes. His wings were quite as useful as before, even if one of them did have a ragged notch in its tip.

All summer long Grasshopper Green lived in the beautiful garden. Every day was filled with exciting escapes. Many a time he was chased by a hungry bird, or snapped at by a greedy dragon-fly. More than once he just missed being gobbled down by the old toad that sat blinking in shady corners. Two or three times, after a joyous whirring flight above the flowers, he landed plump in the middle of a spider's thick silky web. He always managed to kick loose from the entangling threads before the owner came hurrying to see what she had caught in her snare.

He had a chance to get acquainted with all the small creatures who shared the garden with him. When he went walking, he could meet those who lived on the ground. When he went flying, he could see those who spent their time in the air. Sometimes he swung on a grass blade beside a hungry

caterpillar. Sometimes he crawled from leaf to leaf of a plant where ants were hurrying busily to and fro.

Once he met a little cousin of his own who happened to come jumping over the stone wall on his way toward a meadow near a pond some distance farther along. This visitor's slender body was such a bright green that it made our garden grasshopper look a dusty brown beside him. He was different, too, in having much longer feelers. Perhaps he told how cool and delightful it was to live amid the tangled grasses in the damp meadow instead of in the garden.

But Grasshopper Green was too happy where he was to think of leaving his home. Very likely he might have felt different about it if he had not had plenty to eat. Some years, when thousands and thousands of his brothers hatch out all at once in the mountain parks, they cannot find enough food there. So, after devouring every leaf, they rise in the air and fly in an immense

whirring cloud toward the green farms on the prairies. They march on over the land, like a hungry army, leaving the trees stripped and the fields bare behind them.

Our grasshopper, however, was almost the only one who lived to grow up in the garden this summer, and his small jaws could not do much harm. No wonder he was contented! Every day brought some new excitement. Now he jumped this way to find a tender leaf to eat. Now he jumped that way to avoid being eaten himself. Hither and thither he flew, this minute hopping into danger, and the next minute hopping out of it again. Indeed, you see, Grasshopper Green was a lucky young fellow to have been born in this beautiful garden.

# II

# THE ADVENTURES OF AN EARTHWORM

## II

# THE ADVENTURES OF AN EARTHWORM

### I. HOW HE WALKED WITHOUT LEGS

ONE evening when Grasshopper Green was fast asleep, with his feet glued safely to the under side of a grapevine leaf, a new little creature came squirming up out of the ground below. It was a baby earthworm. He had hatched from a tiny egg buried in the soil. The first thing he did was to twist and wriggle this way and that as he pushed his pointed head up through the soft earth to the air above.

After he reached the top, he raised his head and swayed it to and fro to find out what the world was like. And now what do you think? He could not see a single

thing, or hear a single sound. He had no eyes or ears or nose. He had no arms or legs. He was only a soft round worm with a bit of a mouth on the under side of his pointed head.

In the darkness he kept swaying to and fro. He could feel the damp air against his skin. Some of the air soaked into his body through tiny holes in his skin, ever so much tinier than the prick of a pin. The fresh air kept his blood red and pure. It made him feel happy and lively. He moved his head faster and pulled his tail out of the ground. He was ready to hunt for something to eat.

So he set out on his travels. Travelling was slow work for him, because he had no real legs to use in walking. The best he could do was to wriggle over the ground with the help of some stiff little bristles that grew on his body. His body was made up of many joints or rings set close together. On each ring grew eight of these bristles.

When he wanted to travel, he stretched out his head as far as he could, and hooked the bristles nearest his head into the ground. Then he unhooked the bristles that had been holding him steady at his other end, and drew his body up thick and short. When he was as short as he could be, he dug his tail bristles into the ground to hold him steady again, while he stretched his body out long and thin. When he was as long as he could stretch, he dug in his front bristles again, and drew himself up short just as before. It was too hard work to be very much fun, you see.

Luckily for this wee worm, his mother had laid her eggs in the middle of a bed of onions beside the grape arbor. He had hardly wriggled two inches before he almost touched the stem of a young onion plant. He stopped and began to move his head to and fro, as if he were sniffing the onion. Perhaps he smelled it through his skin. When at last he really rubbed against the plant, he seized a bit between

his upper and lower lip, and sucked it into his mouth. Ah, but it tasted delicious! So he swallowed it down as quickly as he could, and pinched off another bit of onion with his soft lips.

He swallowed each mouthful by squeezing it down his throat. He had no teeth for chewing, but after the food had been swallowed, it was ground fine between specks of stones inside him. Very likely he had swallowed these specks of stones while he was pushing his way up from his empty egg shell to the air above. Now they were exactly what he needed for grinding up his food.

Of course he could eat much faster than if he had been obliged to stop and chew every bite. He ate and ate and ate, and his little body stretched out like India rubber to hold the food. When he was so round and tight and full that he felt almost as if he were going to burst, he stopped eating and rested for a while.

The baby earthworm lay quiet and happy

under the onion plant. He was happy because he had eaten all he wanted, and because the dewy night air felt pleasant on his skin.

Far above him the stars twinkled in the sky; but he could not see them. A breeze whispered among the leaves of the trees in the garden; a bird overhead chirped sleepily; the grasses rustled here and there under the foot of some small hurrying creature. But the baby earthworm could not hear these sounds. He felt the earth under him, and the air around him, and the food inside him. And just then he did not care about anything else in the whole, wide, wonderful, beautiful world.

While he rested, the food inside his body was ground up fine and began to be changed into blood. The new blood made him grow a little larger. Even as a baby, you know, he looked like the grown-up earthworms, except that his body had not so many rings. As he grew, he would have more rings; for the last ring at the end of

his tail would divide into two rings. Pretty soon the last ring of the two new ones would divide into two, and then the last one of those two, and so on till he was all grown up.

On this very first night of his life, however, he did not grow fast enough to get a new ring right away. There would be plenty of time for that later. Now, as soon as he felt like working after his first meal of vegetables, he began to hunt around for a place to live.

## II. HOW HE DUG HIS HOUSE

In some wonderful way he knew just what to do, though he had never been taught. He had never watched any other worm dig a hole in which to live. And yet he set straight to work without pausing to think or plan. Indeed he could not think even if he tried to do so, because he did not have that kind of a brain. He simply went on without thinking and did the things that

all earthworms do naturally because their parents have always done the same things.

First he stretched out his head and felt of the ground, now here, now there. He was hunting for a firm smooth spot where he might begin to dig. When he found it, he put his mouth down close to the earth, opened his lips, pinched off a mouthful, and swallowed it. Wasn't that an astonishing way to dig! Then he took another bite, and another, and another, till he was full of dirt. He had eaten a hole in the ground. When he was so full that he could not swallow any more, he pressed his body small so that the dirt was squeezed out. He let this curlycue of earth fall outside, at the top of his hole. It was the shape of a tiny worm, and is called a worm-cast.

He dug all the rest of the night as hard as he could, because he was in a hurry to have a home of his own. Once in a while he found a speck of good food in the mouthfuls of earth. This food stayed in his body and helped to make new blood

and give him strength to go on working. At intervals, very likely, he crawled to the onion plant and took a bite of it to cheer him on in his labor. He just loved onion!

At last, when his hole was almost deep enough to hide in, the sun rose. The wee worm had that minute carried a load of earth to the top and was emptying it outside. A level golden ray of sunlight shot across the sparkling dewdrops and glistened on the busy little brown body of the baby earthworm. Doubtless he had no idea what was causing him to feel so queer and feverish, for he had never before been in the sunshine, you know. He shrugged his ringed body and squirmed and twisted his tail, and lifted his head and swayed it to and fro. Then he wriggled back into the hole, and cuddled down as close as he could in the cool moist earth.

But that did not do him much good, for the sun rose higher and shone into the top of his little cave. In the queerest way he knew, without being told, exactly what he

ought to do next. He reached out of the hole with his pointed head and took hold of a piece of dead grass with his lips. Then he pulled and pulled till he had dragged the grass to the opening of his hole, or burrow, as it is called. He pulled the pointed tip in as far as it would go. It covered the top so that the sunlight could not shine in. Finally, in his cool shady home the wise little worm curled down cosily and rested all day long.

Outside in the garden, the sun shone and the birds sang; the butterflies fluttered their lovely wings and the bees buzzed over the flowers. The grasshoppers swung on the grasses, and the spiders spun webs or went hunting. Under the ground the little earthworm, hidden in his new burrow, which he had dug all himself, lay quiet and waited for the dewy dark night.

When daylight faded and the air grew damp and cool, the young worm woke up and came squirming outdoors. The first thing he did was to hook the bristles at the

end of his tail into the wall of his burrow. Then he stretched out his head, now this way, now that way, till he touched a leaf of onion. After eating all he wanted, he wriggled back into his hole and began to



dig it bigger. He rubbed the inside of his house smooth with his slimy body. Something like glue oozed from his skin and covered the walls with a firm lining. When he had finished it, he had the cosiest kind of a little home, just large enough for one.

### III. HOW HE ESCAPED WITH HIS LIFE

Nothing very exciting happened for a while. All day long he hid in his burrow,

and all night long he worked and ate. Sometimes he dragged pieces of leaves inside his hole and ate them there. As he grew bigger and longer, he had to make his hole bigger and longer, too. And the longer he grew, the farther he could stretch to reach his supper. But by and by came a time when he had eaten every bit of green leaf within reach.

That night he stretched out his head as far as he possibly could stretch in a circle all around his hole. He could not find a single bite of anything good to eat. So what do you think that reckless little worm did then? He unhooked his tail from the top of the burrow, and wriggled away over the ground till he touched another onion plant. Then he ate and ate and ate till he nearly burst, for he was dreadfully hungry. After resting a time, he wanted to return to his home. He squirmed off in a hurry, but he never, never found his way back again. He had lost the first little burrow that he ever dug in his life.

So the next thing he had to do was to go to work and dig a new one. This new hole was like the other, except that it was larger and deeper. He dug it deeper, because the ground was getting dryer than it had been earlier in the summer. There were not so many showers to keep the soil at the surface soft and moist. It made him feel sick to swallow dry soil. So he burrowed down deep where the earth was damp and pleasant to his skin.

One morning he had a terrible adventure. It was just at sunrise, and he had crawled into his burrow and lay resting near the top. The night had been rather chilly, and he felt a little numb. Though he certainly hated to be too hot, he also hated to be too cold. He was waiting perhaps for a bit of warmth from the sun to steal over him before he wriggled down to the deep end of the hole. Or it may be that he liked to stay near the dewy leaf that covered his door. Whatever was his reason, he was lying there quiet and com-

fortable, when suddenly something happened.

A quick patter of little claws, a swift twitch of the dewy leaf, and a robin's beak darted into the hole like lightning and snapped at the worm's soft head! That was a narrow escape. He had wriggled out of reach just in time. He squirmed on down to the bottom of his burrow as fast as he could go, and stayed there curled up safe and still till after the birds had all gone to sleep at night. Then he could come out and hunt for his own supper without getting into danger of being gobbled down by a hungry robin.

Anybody would think that such an experience would teach a worm to stay hidden at home in the daytime. But one queer thing about worms, and many other creatures, too, is that they never learn anything new no matter how long they live. When they are born they know as much as their parents do, and they can never be taught anything more.

You could never imagine how foolishly that little worm acted one day. It had been raining all night in the garden. As soon as he knew that a shower was falling outside, that silly worm came wriggling out as fast as he could wriggle, and squirmed away over the wet ground. He did not even try to stay near enough so that he might possibly find his home again if he hunted carefully all around. He just went crawling on and on and on, without thinking what might happen when morning should dawn. He enjoyed being out in the rain.

He crawled across the onion-bed to a row of cabbages. There he stopped to take a few nibbles. Then he hurried on over the gravel path. On his way, he passed a drowned fly, and ate several mouthfuls of it, for he was fond of fresh meat. Once or twice he felt a soft round body exactly like his own wriggling against him, or under or over him. The rain had brought other earthworms out of their holes that night,

and started them on their reckless wanderings.

Finally the rain ceased, the clouds drifted apart, and the sun rose. Our little worm lay stretched out pale and thin on the path. He was no longer dark-colored, because he had swallowed no earth for hours. His skin was so clear that his two veins full of blood showed red inside his body. He was so tired that he could hardly move.

But as the sunshine fell on him, he squirmed slowly on across the gravel, and dragged himself inch by inch on and on and on. He did not know what was ahead of him, or where he was going. All that he wanted was to wriggle somewhere out of the burning light and heat of the sun.

It was lucky for him that he happened to crawl toward a spot of soft loose soil where a root of celery had been pulled up the day before. He pushed his head beneath a wet lump of earth and drew the rest of his body on into the damp delightful dark little cave. There he rested all

day, while out in the sunshine many other foolish worms dragged themselves blindly on in the glaring heat. Some were gobbled down by hungry birds, and others curled their aching little bodies round and round in tight coils, and lay still till they dried up and died. An earthworm cannot live a day in dry air.

After this our young worm dug another burrow for a new home. You see he really had to have a hiding-place to save him from his enemies. He had no shell to protect his soft body from being trampled on by animals or snapped up by a hungry bird. He had no teeth or sting with which to fight. He had no legs that he could use in running away from danger. The only thing he could do for safety was to hide in a hole.

### IV. HOW HE HELPED THE GARDEN TO GROW

And what do you suppose! This is most wonderful of all. Earthworms help to make all the gardens in the world, because they dig so many holes. They help by

swallowing their bodies full of soil and carrying it up to the top of the ground when they dig their burrows. This makes the soil fine and rich so that plants can grow in it. The leaves which they drag into their burrows and tear into shreds make the soil rich too. There are so many millions of worms working in the ground that all together they dig up tons of earth and turn it over and mix it fine and make it rich.

Besides this, the air from above moves through their winding burrows and keeps the soil loose and sweet. When rain falls, part of the water trickles down deeper because of the holes. Some plants grow faster when their roots find the smooth little tunnels in which they may spread and branch. The deaf and dumb and blind little earthworm is the most useful of all the small creatures that live in the garden.

When our young worm had finished his new home, very likely he felt that he was safe there at last. He was careful not to lie too near the top in the morning, when

robins were out hunting for their breakfasts. He was particular to hook his tail fast to the wall of his burrow whenever he went out in the evening. But one night a still more frightful adventure happened to him. He was chased by a mole.

It happened in this way. He had been working busily for hours in digging out a tiny room at the very bottom of his burrow. He wanted to get it ready for the winter, as the summer was almost gone, and the nights were becoming long and chilly. He was pinching off one mouthful of earth after another, and swallowing them as fast as he could squeeze them down.

Doubtless he must have made some sort of noise under the ground there. Perhaps his squirmings and wrigglings and munchings sounded for inches through the earth around him. Well, anyhow, a hungry gray mole, who was making a tunnel through the celery-bed, heard the earthworm at work. She turned around in her tunnel and began to dig like mad in the direction

of the sound. She was very fond of earthworms for dinner. She clawed away the dirt with her tiny shovel-like front paws, and kicked it out behind her furry little body as fast as she could dig.

Now, as she was almost as big as a rat, she could not help making a stir with her shovelling and kicking. The pounding and thumping shook the ground around the busy earthworm. The instant he felt it, he stopped eating and wriggled up out of that hole faster than he had ever wriggled before. Though he had never heard of a mole, something told him to get away from that spot as soon as he possibly could.

He squirmed up to the top of his burrow, and waited a moment. The thumping and pounding seemed nearer than before, so he wriggled away at his very best gait, stretching out his head and drawing up his tail, stretching out his head and drawing up his tail, stretching out his head and drawing up his tail, till he bumped into a celery stalk and curled down to rest. He kept

still and did not move even the ring at the tip of his tail. This was lucky for him, because the hungry mole had plowed her way clear up to the top of the worm's empty burrow and was poking out her head to sniff around in the dark at that very minute.

As soon as the earthworm felt able to work, he was obliged to dig another hole. This one he wanted to make deeper than any of the others, because winter was coming. In winter the ground freezes hard on top, just as water freezes into ice on the surface of a pond. Digging on a cool night in autumn was slow work, because the cold made the worm feel numb and lazy. Sometimes his soft body felt too stiff to stretch another inch. But he kept on burrowing deeper and deeper till he had finished a safe and cosy little room far down in the ground where the soil around would not freeze, even in the coldest weather.

When he was ready to begin his long winter sleep, he dragged some dead leaves

into his new burrow and plugged up the opening so that the frosty air could not creep inside. Then he crawled down to the very bottom and curled up in a soft little brown bunch to sleep till the spring sunshine melted the frozen earth above him, and the warm sweet showers came trickling through the soil which he had helped to make.

# III

# MISCHIEVOUS MADAM MOSQUITO

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# MISCHIEVOUS MADAM MOSQUITO

### I. WHERE THE LITTLE WIGGLERS LIVED

ONE spring morning, long before the sun rose, a little mother mosquito went flitting over the garden. She was looking for water in which to lay her eggs so that there would be some baby mosquitoes by and by. She hunted along the path, and around the bushes, and in the corners of the hedge; but she could not find even a broken bottle or empty tin can that might have held some drops from the last shower.

Then she flew to the house at one end of the garden and crawled over the rain-water barrel in search of a crack in the cover. When she was sure that she could

not possibly squeeze inside to lay her eggs, she went to the hydrant on the lawn to see if the hose had been leaking in a puddle underneath. But she could not find a single muddy spot. So she spread her filmy wings again and flitted away over the hedge and across the street and around a barn to a pond in a vacant lot beyond.

The pond had begun to dry up at one end. The ground near it was wet and spongy, with long yellow grasses bending over little pools here and there. These pools were exactly what the mother mosquito wanted, because there were no fish in them to eat her babies. Perhaps she knew that the fish in the pond could not flap across the grassy spots to reach the puddles scattered over the marshy place.

Anyway, she flew to one of the patches of quiet water and dropped her eggs upon it. She laid as many as three hundred or more. They were all stuck together in a tiny raft which floated out on the surface of the pool. The sun came up and shone on

the ripples. A bird swung on a reed and fluttered down to drink. She dipped in her bill, splash! so near the wee brown raft that it was almost sucked inside. Away it went, dipping and tossing in the fairy wavelets, when suddenly, kerplunk, a big green frog hopped right on top of it. But the tiny raft was light as cork, and instead of sinking beneath him as he swam down to the bottom, it bobbed up to the top of the water again, and danced wildly hither and thither in the whirling billows caused by his plunge.

All the sweet spring morning the raft floated in the sunshine, and early in the afternoon the baby mosquitoes hatched out.

Now you would have been surprised! The babies that came squirming out of those eggs did not look a bit like their mother. They were nothing but soft dark little wigglers. The first tiny creature that wiggled out of the largest egg dived from under the raft and swam up to the surface

of the pool to breathe. Instead of poking her head up to the air, she hung upside down, with one point of her forked tail pushed up to the top. She breathed through a tube which was in her tail instead of in her head.

As soon as she was full of fresh air, she began to flap the other point of her tail. Away she swam, bending and twisting and squirming, this way and that, as fast as she could wiggle. While she was darting and doubling, she kept waving the hairs near her mouth to and fro. This quick steady motion drove the water toward her mouth. In the water were the very tiniest bits of food for her. When they floated into her soft open mouth, she swallowed them and waited for more to be pushed along by the busy little hairs.

After swimming and eating for about a minute, she flapped up to the top again to take another breath. Then she hurried down to eat. Going up was hard work because she was heavier than the water

She had to jerk her tiny body very fast and wiggle her tail and flap all her little swimming-hairs at once. She had six swimming-hairs on her tail and others on the rest of her body. She rowed with hairs as you swim by kicking your legs and throwing out your arms.

As soon as she reached the top of the pool and poked her breathing-tube into the air, she felt lighter, because the new fresh air in her helped her to float. So she could hang there upside down without any trouble. When she was ready to go swimming around below again, she wiggled away downward as easily as a real fish.

Now one day a very dreadful thing almost happened. When she came hurrying up to breathe, after being a whole minute down at the bottom, she could not poke the end of her breathing-tube through the top of the water. Though she pushed with all her might, and flapped and twisted and jerked, she could not reach the air above. It seemed as if there was a layer of thin rub-

ber over the surface of the pool. Finally she gave a last wild squirm, and managed to slip out from beneath that dangerous spot. Her tail stretched up to the air in a twinkling. She hung there, breathing and breathing and breathing, deep down and all the way through her soft body. She had almost drowned that time.

What caused all this trouble for her had been a drop of oil that had floated from over a dead frog at the edge of the pool. The oil made a tough film on the water, just where she tried to push through at first. If she had not wiggled away from under it and found a clear space, she would surely have drowned. Sometimes, when people wish to get rid of mosquitoes, they pour kerosene oil on the ponds and puddles near their houses. Then all the wigglers drown because they cannot poke their tails up to the air to breathe.

Not long after this narrow escape, the young mosquito had an adventure that was really a joke, though very likely she did

not find it funny. She was wiggling hither and thither while she swallowed her dinner. A hundred or more of her brothers and sisters were twisting and dancing and squirming around her in the pool. Suddenly, with a swish and a rush, a terrible monster of a tadpole dashed among them. His tail went flap, flap, flap, as he darted this way and that, with his round horny mouth opened hungrily.

Now how were those frightened little wigglers to know that tadpoles are vegetarians and eat bits of plants instead of gobbling up lively mosquito babies by the dozen? They were doubtless quite as much scared as if he had been a great greedy fish instead of a harmless tadpole. They skipped in every direction to escape from the tossing and twirling of the ripples which surged about his thrashing tail. A tadpole, or pollywog, as it is called, may not seem very large to you. But you just try being a tiny wiggler once, and you will see. Perhaps you would feel like making

up a fairy tale about a horrid big fat ogre called Pollywog-the-Wiggler-Killer.

In spite of such perils, the mosquito baby grew fat as she ate more and more. When she was too big for her old skin, she wiggled out of it, and wore a new one a size larger. The third time she changed her skin, she looked so different that she would hardly have recognized herself with her own eyes, if she had happened to have any.

The head end of her body had swollen out big and round. She breathed through two little horns at the back of her neck, instead of through one of the points of her tail. She felt so light that she stayed at the top of the water most of the time, with her horns poking through to the air above. She did not care about eating now. She was happy enough just to float there, breathing and resting at the surface of the pool.

It was not a very safe place for her, because there were dragon-flies living near

that pond. More than one of them caught a glimpse of the two tiny horns sticking through the water, and came swooping down to catch the little fat morsel below. It was the queerest thing how that soft, dark, wee body, without eyes or ears, knew when the dragon-fly was coming. It may be that she could feel the shadow of the gauzy wings flitting above the water. At any rate, she always vanished like a flash before the hungry dragon-fly could snap her up. Away to the bottom she flapped, bending and twisting her slender body. She found now that swimming down was harder work than floating up, because her head end was so light and full of air.

Dragon-flies were not her only enemies during the two or three days that she swung there in the water. Once a frog jumped at her, and another time, as she hung breathing at the surface, a bird spied her and darted at her just a moment too late. She had paddled downward like a flash. That was exciting enough, you may

be sure. But the worst danger of all her babyhood was yet to happen.

Somehow or other there chanced to be a few fish eggs in that pool. Maybe they had been laid there before the pond had dried away, leaving the marsh with its separate pools here and there amid the long grasses. Well, anyhow, one morning some minnows hatched out of those eggs, and began at once to chase the little wigglers.

It was, of course, sad for the wigglers, though possibly not so bad for the minnows or for the people who might have been bitten by the mosquitoes if the wigglers had escaped. But those energetic young minnows ate every wiggler in that pool except our wee creature who was the oldest of them all. She squirmed away while the minnows were busy catching the others. She wiggled close to the bank where there was not enough water for them to swim after her. There she stayed till night brought sleep to the young minnows who had been joyously darting to and fro

all day long in that pool, once the home of three hundred merry little wigglers.

There at the edge of the water floated the mosquito baby in the darkness. She did not worry about the next morning when the hungry minnows would surely wake and swim around hunting for breakfast. Maybe the smallest one might flap along on his side through the shallow water to catch the little wiggler. But an animal like this young insect cannot think, and therefore she never worries. She only cares about the way she feels at the moment. And all that night she felt quite comfortable except that her skin seemed to be getting tighter and tighter.

## II. WHAT MADAM MOSQUITO DID IN THE GARDEN

In the morning — now perhaps you have been expecting this — her skin split, and out of the crack crawled a grown up mosquito with a small head, a long slender body, and two gauzy wings. These wings

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quito. Little Madam Mosquito must have felt this fact to be true, for she wisely flew away as soon as the terrible-jawed, four-winged, big-eyed dragon-flies had gone to sleep at nightfall.

Off she flitted across the pond in the dusk. It seemed a long journey to her, for her wings were not very strong. The light evening breeze that blew over the water tossed her hither and thither as it carried her onward. She was glad enough to reach the shore and flutter to the ground, where she clung to a weed till she felt rested.

Then she started out again and flew humming toward the garden. This humming song was caused by the air beating against a certain part of her breathing tubes, as she hovered with wings outspread. Another mosquito heard her song, and came flying among the trees to find her. He could tell in what direction to go by the way the sound stirred his feathery feelers, or antennæ, as they are called. When

he first heard her, the humming note ruffled the hairs on the outside of the left one. He turned his head till he could feel both his antennæ ruffling just alike. By that he knew that she was straight in front of him. So he flew on till he found her. Then they flitted together through the garden in the sweet spring twilight to a blossoming cherry tree.

The young brother mosquito did not care much about eating, for he could not bite through anything. The sister mosquito was different. She had at her mouth a long sharp beak no thicker than a hair. She could push it through tender skin as if it were a needle, and suck up the juices inside. This evening she pricked into the center of the cherry blossoms and drank the nectar there. Then she flew to the vegetable beds and settled on one plant after another to taste the sap.

By and by, as she flitted here and there, she happened to go near the house at the end of the garden. In a hammock under

a maple beside the front piazza two children were swinging. The mosquito wanted to alight just then and rest her wings. So she settled down on one of their hands. It was natural for her, when she felt the soft skin under her feet, to press her mouth close, stab her beak in, and suck, as she had been sucking the juices of the plants and flowers.

The fresh warm blood flowed up into her mouth. Ah, but this was the best thing she had ever tasted! She sucked and sucked and sucked till suddenly, slap! A small hand had almost smashed her into a flat red stain. The wind that it made as it struck toward her had startled her barely in time. She pulled out her beak and dodged in a hurry.

But instead of flying far away from that dangerous place, she kept hovering near. Every chance she could get, she alighted on a hand or an arm or a forehead, and tried to get another delicious mouthful. She even bit through the little boy's stock-



"IN A HAMMOCK UNDER A MAPLE TWO CHILDREN WERE SWINGING."

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ing, and pricked the little girl on her shoulder under her dress. They kept slapping at her till their mother called them in to go to bed.

That young mosquito, now that she had tasted blood, never ate anything else. She did not care for sap or nectar any more. If she had stayed in the marsh, or gone to live in a wood where there were no people, she would have eaten only the juice of plants, with now and then a bite perhaps of some dead animal. Millions of mosquitoes never have a chance to suck warm blood as this little one did.

Sad to say, the more blood she drank, the greedier she grew. Every evening she flitted out from her daylight shelter under a bush and hovered teasingly about the children in the hammock, or hummed around their parents on the piazza. She became so bold that she no longer dodged the very first instant she felt a hand slapping toward her. She kept waiting just a moment more, and then another moment,

and another, before she pulled out her beak and flew quickly to one side.

At last there came a sad evening when she waited one moment too long. Slap, crack, and Mischievous Madam Mosquito was dead!

# IV

# THE MOST BEAUTIFUL ONE IN THE GARDEN

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## I. THE CATERPILLAR BABY AT HOME

NEAR a gooseberry bush in one corner of the garden a milkweed plant was growing. On one of the silvery green leaves was a white dot of an egg which a big red butterfly had laid there four or five days earlier. Now something alive was beginning to move inside the tiny egg. Wee baby jaws were cutting out a hole in one end, about as big as the point of a pin. Up pushed the bit of shell like a lid, and out peered the queer crumpled little face of a baby caterpillar.

He was hardly big enough to notice, and he certainly did not look as if he would ever grow to be a butterfly with four beau-

tiful wings. He seemed to be nothing but a little striped worm on a weed. The first thing he did was to turn around, after he had squirmed out of the egg, and eat up the shell. This took some time, because his mouth was so very small. Though the egg itself was tiny, it was, of course, far larger than his speck of a mouth with its wee lips and jaws.

The caterpillar did not eat the shell because he liked the taste of it. He did not even know why he ate it, but I can tell you. If he left the empty shell on the leaf, some hungry bird, or fly, or spider might notice it. Then they would know that a baby caterpillar was somewhere near, and they would hunt among the leaves till they found him. So, naturally, it was safer for him to get rid of it as soon as he possibly could. He did it because his father and mother had done it when they hatched out of their eggs. His grandfather and his grandmother had done the same; and his great-grandfather and

his great-grandmother, and so on back for years and years and years. That was one reason why they had lived to grow up and have children of their own, instead of being eaten up themselves while they were babies. This habit of eating the empty eggshell is so strong with caterpillars that they all do it the very first thing without understanding the reason why. Such an inherited habit is called an instinct.

After our little striped caterpillar had swallowed the last bit of shell, he rested a moment, lying very still on the leaf. Perhaps his mouth was tired. Eating is rather hard work when the thing one is eating does not taste very good. But in a few moments he felt hungry for real food. Now do you think that he had to hunt around and go squirming this way and that to find it? No, indeed! The mother butterfly had laid the egg on the very plant which her baby would like best to eat. There he was lying right on top of his dinner. All that he needed to do was to push

out his lip against the leaf under him, suck back a bit of it into his mouth and cut it with his strong jaws. It was tender and juicy, and it tasted so delicious to him that he ate and ate and ate till he had eaten a hole through the tip of the leaf.

By that time he was ready to rest again. Of course, if he had wanted to, he could have taken a little nap right there where he had been eating. But somehow he knew that it was safer for him to crawl to the under side of the leaf, and lie hidden in the shadow. Then a hungry bird, or a spider out hunting for his dinner, could not find him so easily as if he had gone to sleep in plain sight on top of the leaf.

He did not rest very long, because he was in a hurry to eat again. In fact a caterpillar's chief business in life is to eat and grow. All day and part of the night he kept on doing the same thing. Now he crawled to the tip of the leaf and gnawed away till he was tired. Then he squirmed

back to the under side and rested till he was hungry again.

When he moved, he did not drag his body on by stretching out his head and drawing up his tail, as an earthworm does. Though he looked like a worm, he really was not a worm. He was a baby insect, and he had six true legs, as all insects have. These six true legs were under his body next to his head. They had horny claws and were jointed so that he could use them in walking.

Besides these legs, he had ten others farther back toward the tail end of his body. These ten prop-legs, as they are called, were short and stubby. They helped to prop his body up above the leaf. They paddled along behind when his six front legs started out walking.

The ten prop-legs helped him in another way too. On the tip of each one were tiny hooks that hooked around the little hairs on the stem of the milkweed, and kept him from falling off. At first he was so careful

in stepping from one spot to another that he spun a silken thread ahead of him as he walked. On his lower lip was a horny tube. Out of the tube came a thread like that of a spider's web. Wherever he moved, he kept swinging his head from side to side and fastening the thread over the leaf like a zigzag ladder. That made a safe path for him, because he could hook his hind legs fast at every step.

If it had not been for his spinning thread, he might have had a bad accident one morning. He was hurrying over the edge of the leaf on the way from his nap to his dinner. Just as he was half across, with the last part of his body swinging loose in the air as he scrambled from one side to the other, there came a thump and a bounce. A bird had alighted suddenly on the stem of the milkweed, and made it teeter up and down. The little caterpillar hung on as tightly as he could, digging the claws of his six forefeet into the edge of the leaf, but the plant gave such a jerk

upward when the bird flew away that he lost his hold. Down he fell; down, down, down, — for as much as an inch.

All at once he stopped falling and hung there in the air. The thread of silk from the tube on his lower lip kept him from dropping to the ground. One end of it was still fastened to the zigzag ladder which he had been spinning as he crawled over the leaf. So there he swung at the other end of it, with his tiny, striped body squirming and twisting. But he soon found that he was safe and in a moment he climbed up the thread and went to eating again.

## II. LOST IN THE WILDERNESS

After he had been eating for about two days, he began to feel as if his skin was getting too tight for him. Of course, the more he ate, the fatter he grew, but his skin remained the same size it was at first. Naturally he felt crowded inside. Now

perhaps you can guess what happened next.

He walked to and fro over the leaf, moving his head from right to left as he spun a little carpet out of his silken thread. When the carpet was quite thick, he lay down on it and tangled the hooks of his ten prop-legs in it. He lay very still and waited till his skin cracked and slipped back over his body to his hind legs, then he walked out of it, and after resting a while he turned around and ate up his old skin.

There he was in a new bright skin. He was big enough now to be easily seen. He was about as long as a grain of rice. He was very pretty, with his striped body and his little yellow face marked with two black arches. Behind his head he had two slender black horns which kept twitching backward and forward as he walked. He was not so careful now to spin a thread in front of him as he moved. This was the reason why he had a dangerous adventure one day.

It happened one afternoon that he was hurrying to crawl under a leaf before a thunder-storm could catch him and wet him. The drops began to patter down just as he was wriggling along the stem of the milkweed as fast as he could wriggle. He was in such haste that he did not take time to hook fast to the hairs on the plant at every step. So, when three big drops of rain came trickling down behind him and rushed against him with a swish and a splash, he lost his balance and slid off to the ground.

If he had been spinning out a thread as he moved, he would have been able to climb up it to the plant again. But now he was lost in the grass below, for he did not know how to find his way back. Though he had a curved row of tiny eyes on each side of his head, he could not see well at all. He knew when it was light, and he knew when it was dark, but probably he could not see things any better than you could if you had a cloth over your eyes.

The poor little caterpillar lay still for a moment after he had dropped with a bump. Then he uncurled and began to crawl away as fast as he could scramble. When he moved, first the horn, or feeler, on one side twitched forward, then the horn on the other side. If a feeler touched a pebble or brushed against a leaf, he knew that he must turn out and wriggle away in a different direction. It was just as if you were running in the dark, with your hands stretched out in front to feel your way.

On scrambled the lost baby caterpillar through the forest of grass. His slender horns twitched backward and forward. The skin on his back wrinkled up in tiny folds over his jointed body and then unwrinkled, as his front legs trotted along too fast for the stubby hind legs to follow without dragging. Being lost was very confusing. He hurried in one direction blindly till the tip of a horn brushed against a root, then he turned and crawled swiftly in another direction till he felt the steep hard wall of a

pebble in his path. After wriggling around it, he set out straight ahead again in a greater hurry than before. He did not know what was the matter, or where he was. He only knew that he was lost in a strange dreadful place, far away from the soft hairy stem and tender leaves of his milkweed home.

Before he had scurried forward three inches, he almost bumped into a dead stick. He dodged to one side in such wild haste that he could not stop himself in time when he felt his front pair of feet clutching at the empty air. He was right on the edge of a hole which had been dug by a squirrel. Down he tumbled, rolling over and over till he reached the bottom.

The fall did not hurt him, because he had no bones to break. But what do you suppose? A big gray spider lived in that hole. She was hanging in her web in one corner. When she felt the threads jerk and tear as the caterpillar fell through, she ran out to discover what was the matter. But he

lay so still, curled up in a round little ball, that she could not see him, for he was as much as four inches away from her. If he had moved, perhaps she would have noticed him, because spiders, and many insects and birds, too, can see moving things more easily than things that are not moving. It was lucky for the caterpillar that he did not begin to wriggle out straight till after the spider had turned and crept back to the middle of her web again.

However he never learned what a terrible danger he had escaped. As he could not see her or hear her, he did not even know she was near. It just happened that she was not looking when he uncurled and started scrambling up the side of the hole. After reaching the top, he kept on in the direction his head was pointed. He hurried along till his horns touched a plant. Instead of squirming away from it, somehow he wanted to crawl up the stem. And so he did. The moment he felt the soft hairy covering under his feet, he flapped

out his lip and took a big bite of a tender leaf. He knew that he had found a milkweed home at last.

### III. THE CATERPILLAR BABY GOES TO SLEEP IN HIS CRADLE

He must have been the happiest little caterpillar in all the garden that day. The first thing he did was to rest a while, for he was tired from his wanderings. Then he crept out on a juicy leaf and ate and ate and ate. He had never been so hungry before in all his life.

Day after day he ate and rested. Sometimes he ate at night, too, although he moved more slowly and slept longer when the air was cool on his skin. Four times he changed his skin, and appeared in a bright new suit. When he had grown to be almost two inches long, a wonderful thing happened to him. He went to sleep a striped green and yellow caterpillar, and woke up a red butterfly, the most beautiful little creature in the garden.

This is the way it happened. After coming out in his last new skin, he ate greedily for two or three days. Then he



did not seem to care for more food. He crawled over the leaves without stopping to eat. He roamed up and down the stem till finally he felt so queer and restless that he crept to the ground and went hurrying

off through the grass. He walked on and on till he reached a stone. Up he crawled, and over the top, and down the other side. He did not stop, however, because he had not yet found what he was seeking. He was seeking a safe, sheltered spot where he could prepare for his long nap.

Beyond the stone he came to a tree. Up he climbed, wriggling across the rough places on the bark, squirming through the cracks and hollows. When he felt a branch stretching above him, he walked out along its under side and began to spin a carpet of his silken thread. This carpet was like the little mats he always spun whenever he was getting ready to crawl out of an old skin. The only difference was that he made one spot in it very thick. After he had finished it, he crept out upon it and hooked his last pair of legs into the thick spot. Then he let go with all the rest of his legs and swung head downward, almost as a boy hangs by his toes to a trapeze.

All day and all night he swung there on

the under side of the limb. Instead of hanging down straight, he curved his head up toward his tail. That made his skin stretch so tight over his rounded back that soon it split and began to shrivel away. When it had shrunken to a dry little bundle clinging around his last pair of legs, he jerked out the tail end of his body by twisting and whirling. Then he caught hold of the thick part of the carpet with the hook on his tail. The old skin with its two horns and ten prop-legs dropped off, and left him hanging there, all wrapped up in a soft green chrysalis.

Through the pale covering of the chrysalis the new butterfly could be seen with its wings folded around its jointed body. It was not ready yet to awaken and fly away. It must sleep till its wings, and eyes, and legs, and tongue, and feelers could grow strong enough to be of use. So it hung there under the branch for more than a week.

The early sunbeams stole in level rays

across the garden and shone on the green and gold cradle of the sleeping butterfly. Once Grasshopper Green went whirring by on his way to find a fresh tender leaf. Sometimes a spider scampered past on its eight long legs, or a woodpecker paused in her hunt for insects under the bark to nip at the chrysalis. She could not peck a hole through, because the covering of the pretty case had hardened and thickened to protect the delicate young creature inside. Once in a while a puff of wind set the cradle swinging gently; but there was no motion within, except a feeble wriggle now and then.

### IV. BUTTERFLY RED WINGS WAKES UP

At last came a beautiful morning after a night of warm drizzling rain. The dampness softened the shell of the chrysalis. When the sun burst through the gray clouds, it set all the wet leaves twinkling. Gleaming drops of water trickled around the limb and dripped softly upon the green

cradle. Was it moving? Did something stir within? Yes, surely it had quivered, and begun to swing lightly to and fro, though there was no breeze to bend even the grasses.

Click! The shell cracked, and opened slowly like a fairy door. The butterfly had awakened. He bent this way and that, struggling to escape from the chrysalis case. He drew his head from beneath the covering. He pulled out his six legs and, setting them upon the outside of the case, he crawled up to the limb above. There he hung, damp and weak, his wings drooping downward, his large eyes shining like jewels in the sunlight. He was a real butterfly now, in a garden world of leaves, and light, and flowers. He would never again be a greedy little caterpillar who cared for nothing else except eating all the time.

While he clung to the limb, his four wings grew slowly larger and stronger, as blood flowed into them from his body.

He waved them gently to and fro. The air hardened the tiny shining scales that covered his wings like satin. This particular butterfly had wings of deep orange red, veined with black, and dotted on the edge with white. Such butterflies are common everywhere in America, and are called by the name of "monarch," perhaps because they are such splendid, big beautiful creatures.

Though this young butterfly had great, gleaming eyes, he could not see his own body, and so very likely he did not care what color he happened to be. Just at first he was more interested in his tongue than in his wings. It was a queer tongue, made of two long hollow pieces. He had some trouble in fitting these halves face to face to form a tube. He kept trying again and again, laying them together and then drawing them apart till he succeeded in hooking them right. Then he coiled the tongue, like a watch spring, up to his mouth.

His mouth now was not in the least like the mouth he had while he was a caterpillar. Instead of a tiny flapping lip and horny jaws for nibbling, he had only this slender tongue between two short feathery horns. Never again in all his life could he take a bite of tender, juicy green leaf. He could not eat anything except what might be sucked up through the tube of this long tongue.

At last he was ready to fly. He lifted his wings slowly upward till they were folded close together over his back. Then he unclasped his feet from the bark of the limb, and spread his beautiful wings. Away he sailed through the air. On in the sunlight he fluttered like a living flower. He was searching for a real flower from which he might suck up the sweet juice of honey. He had eaten nothing since the day he had fallen asleep in his green and gold cradle.

### V. LIFE AMID THE FLOWERS

Over the garden he flew, past the very milkweed where he had lived when he was a baby caterpillar. He did not notice the pale green and white blossom that swayed on the tip of the slender stem. Though his eyes were large and bright, he could not see things very distinctly. Only the gayly colored flowers attracted his attention.

Beyond the milkweed some poppies were growing in the grass around the currant bushes. The butterfly caught a glimpse of spots of glowing yellow, and fluttered toward them. He hovered near, now drifting with the breeze, now soaring with wings outspread, till he was close enough to smell the flowers. He could smell with the two long thread-like antennæ, or feelers, above his eyes.

Slowly he fluttered down upon one of the yellow poppies, and uncoiled his long tongue. Here and there, into the golden

heart of the flower, he thrust it again and again till he had found the honey. Then he folded his wings above his back and stayed motionless on the petals while he sucked up the sweet juice. When he had taken all the honey in that flower, he flitted on to another and another. Oh! it was delightful to be a butterfly in a fragrant garden.

Long before evening he crept under a leaf on a bush, and slept till the morning light grew bright and warm, then he was off again to hunt for fresh flowers or rest lazily on the leaves in the sunshine. One day while he clung to the tip of a twig, half opening and closing his wings drowsily, he felt a sudden rough dash of wind blow his antennæ backward. He had barely time to fly quickly to one side, just as a straw hat came swooping down over the spot where he had been resting. The rim of the hat snapped against the tip of one wing and tore a nick in its velvety edge.

The boy who had tried to catch him ran laughing along the road, while the injured butterfly fluttered away over a field. If the hat had broken his beautiful wing, he would never again have been able to fly, but would have crawled hither and thither, dragging it drooping and crushed by his side, till he died of hunger. For how could he have found enough honey to keep him alive, if he had lost the wings that carried him from flower to flower?

The butterfly did not know what had hurt him. He soon forgot all about the past danger, as he drifted onward to a hillside sweet with blossoming clover. There were other butterflies there, some white, some yellow, some blue, some purple. Bees who lived in the garden were gathering honey to take back to their hives. They worked hard all day long, making honey and wax, caring for the baby bees at home and doing a dozen other things. You shall hear of them when you read the story about bees. But the idle butter-

flies did no work from morning to night except seek nectar among the flowers. Nectar is a kind of watery honey.

It must have been pleasant to be a butterfly in summer, especially to be a big red monarch with strong wings spread to the breeze. When this one of ours went soaring high among the tree tops, he was not afraid of being caught by a bird. His parents had never been afraid either; and somehow, without thinking about it, he knew that birds did not like the taste of any of his family. So, while many of the other kinds of butterflies flitted quickly here and there, or dodged and hid low amid the bushes, he sailed on in plain sight. Sometimes he sported alone or played with another butterfly, circling around his companion as they fluttered up, up, up in the sunshine.

## VI. AWAY TO THE SOUTH AND BACK AGAIN!

If only it were summer all the year, what a lovely time the butterflies would

have! But at last the autumn came, as it always does; and the days grew shorter and cooler. It was only during the sunniest hours now that Red Wings fluttered over the garden like a lovely flower. He did not feel like stirring as soon as he awoke in the morning, because the cold air made him dull and lazy. He did not even want to lift his wings, but dozed comfortably till the sun shone warm enough to open fresh buds on the marigold bushes. Then he came flitting out to hover over the blossoms.

One day he slept so late that the bees had time to take all the honey from every flower in the garden before he began to hunt for any. There were not many flowers in bloom now, for the clover was gone, and an early frost had nipped the nasturtiums. The butterfly was so hungry that he flew across the hedge to seek wild asters and goldenrod in the fields along the road.

On he sailed, pausing now and then to alight on a plant or to sip a drink from a

quiet pool. Once as he was resting, with his wings folded above his back, he smelled another monarch butterfly somewhere near. He waved his antennæ to and fro so as to smell better. Yes, surely he had not been mistaken. Though he could not see them yet, he knew that many big red butterflies like himself were gathering among the bushes not far away. They were getting ready to journey southward for the winter, as some birds do. The monarchs, being the strongest fliers among butterflies, are the only ones that can travel very far.

So he flew joyously onward till he found them. There were thousands and thousands, some resting on the ground, others clinging to the leaves and twigs and limbs. In a few days they began to fly toward the south. For weeks they sailed through the air about as fast as a man can walk. Of course our butterfly did not know how many there were in the great swarm about him. He could see, perhaps, moving dim

spots of bright color here and there, above and beneath and behind and ahead of him. He could smell many more. When they came near enough, he could touch some with his antennæ. At night he clasped his front pair of feet to some twig so close to his companions that he had no space to spread his wings. In the daytime they all soared steadily southward till they reached a land where the sun shone warm and flowers bloomed all winter long.

There the swarm separated. Some flew this way, and some flew that way. Our butterfly stayed in the South till spring. When the lilacs began to bloom in the beautiful garden where he had lived as a baby caterpillar, he came flying toward the North again.

His wings were a little ragged by this time, and quite faded, for he was getting old and had flown many miles with the wind ruffling the delicate scales that clothed him. Of course every time he folded his wings or beat them together in flying, he

wore them out the least little bit. But, joyous as ever, here he was again, floating over the fields where he used to seek nectar from the flowers.

Three or four young milkweed plants had sprung up from seeds where the old milkweed had been growing the summer before. On the tip leaf of each one was a white dot of an egg laid by a mother monarch butterfly. On other plants and weeds were eggs of caterpillars of other kinds of butterflies. Here and there a new young butterfly, with wings of pale yellow, or white, or blue, came crawling from its chrysalis cradle and clung to a leaf while it waited to grow strong enough to fly. In the garden the lilacs and the lilies and the apple-blossoms opened their golden hearts to the sunlight and waited for the bees and butterflies to come visiting for honey.

# V

# THE UNTIDY FLY

# V

# THE UNTIDY FLY

## I. THE PLACE WHERE HE WAS HATCHED

NOW it happened that some distance down the street from the house with the garden was another house where an untidy family lived. This other house had a garden also; but the flower-beds were crowded with straggling weeds. In the back yard so many ashes had been scattered carelessly over the ground that not a single earthworm burrowed there to help make the soil rich and light. The cover to the cistern was so loose that dozens of mother mosquitoes had laid their eggs in the water. Worst of all, a heap of dirty straw beside the barn door lay steaming in the August sunshine.

Above this rubbish from the stalls hun-

dreds of flies were buzzing lazily. Now and then one of them alighted on the heap, and crept down into a crack. In a moment she crawled out again and went to buzzing as before. But she had left something tucked away beneath a clod or a straw. What do you think it was? It was a bunch of tiny white eggs that would hatch into baby flies the next day.

Perhaps you would have been surprised if you had seen what kind of a baby came wriggling out of one of the eggs the next morning. He looked like a fat little white worm with a speck of a mouth at his head end. Of course the first thing he wanted was something to eat. Luckily for him, his mother had laid her eggs right in the very food that her babies would find best for them. If they hatched out on sand or clean fresh-smelling earth they would have starved to death, or else dried up and died, as they squirmed this way and that in seeking a place soft and moist and slimy with rotting things.

This manure heap was exactly what they needed. The mother had been a wise little fly to choose so well with her dot of a brain. She had laid more than a hundred eggs in a bunch, and as she could not take care of so many babies all at once, she put them where they could take care of themselves.

For a whole day the baby fly, or maggot, as the name is, squirmed amid his brothers and sisters in a corner of the heap, and ate the soft wet parts near his mouth. He did not eat the hard bits of hay and straw. He felt warm and damp and happy. His round little body grew too large for his skin. So when it cracked open, he wriggled out in a new white skin. Then he went to eating for another day. Once again he changed his skin, and squirmed around livelier than ever, as he sucked away at the rotten mass.

After three or four days more, the maggot seemed to lose his appetite. He began to feel so queer and drowsy that he

dragged himself off under a straw and went to sleep. While he slept, he turned brown and grew hard outside. He was shut up in his own skin as if he were lying in a tiny barrel. The greedy little maggot, who could do nothing except wriggle and eat, was changing into a big-eyed gauzy-winged fly.

When the young fly began to wake up, doubtless he felt queerer even than when he fell asleep. How could he know what had happened? He could not look at himself, for he was all doubled up in the dark case formed by his old skin. His six new legs were bent under him, and two limp wings pressed close to his sides. Perhaps he tried to squirm around as he used to do when he was a maggot. Instead of a pleasant, simple, little wriggle from mouth to tail of a soft tiny body, his two wings quivered, his six legs twitched and tickled him, and his new head waggled on his speck of a slender neck. He had never had a real neck before. Now he found a

neck very convenient, for what do you think he had to do? He had to hammer a hole in the hard case with his head.

So up and down he hammered away without exactly knowing why till, crack, the shell split, and out crawled the young fly! Dear me! but it was thrilling to have legs. He ran a few steps this way, and then turned and ran a few steps that way. He crept along a straw, his damp limp wings hanging by his sides. The light made him feel dizzy; for this was the first time he had ever had real eyes. Now that he had two big ones and three little ones on the top of his head, he must have found the world much more interesting than before, when he was a blind little maggot. Perhaps the world itself seemed to have changed after he went to sleep, though in fact it was only he himself who was different.

Since he found mere legs and eyes so exciting, fancy how he felt when at last he discovered that he could fly! While he was

running nervously to and fro, his wings had time to dry and expand to their full size. He was a full grown fly now, although so new. Winged insects, when they first come out from the chrysalis, are as big as they will ever be.

This young fly, being still weak from his long, cramped sleep without food, wobbled a little as he walked along a slippery straw. Somehow he slid off, though he certainly should have known better than that, for his feet were even stronger for clinging to smooth surfaces than the grasshopper's. Well, off he staggered in the moist rotting spots where slimy maggots were squirming happily. Queer! but now that he was changed and grown up, he did not enjoy manure much at all. He hated to draggle his slender legs and soil the edge of his wings, for one reason, perhaps, because it was so much trouble to clean them.

He crawled upon another straw as fast as he could, and rubbed his front feet to-

gether to brush off the dirt. Then he lifted his last pair of legs and scraped them under and over his wings. And then — wonder of wonders! Even he himself did not understand quite how he did it. Away he was sailing in the sunshine, his gauzy wings beating the air so fast that they did not seem to move at all.

### II. HIS ADVENTURES IN A KITCHEN

Now wouldn't you have thought that flying was fun enough for a while? But, no, of course the first thing that fly wanted was something to eat. He seemed to feel that the chief use of wings was to carry him to find food. So away he buzzed over the ash-strewn backyard and tangled flower-beds, till he reached the porch of the house where the untidy family lived.

Ah, but something smelled enticing! It was a beef-steak being fried on the stove in the kitchen. The hungry fly flew straight toward the smell, nearer and nearer, till bump! he struck the screen

door. Naturally, being so new to the world, he did not understand that a screen door is intended to keep flies outside the house. All he knew was that the delicious smell came from the other side of this provoking wall full of holes not nearly big enough to let him squeeze through.

He crawled up and up till he struck the top. Then he scrambled buzzing down to the ledge and began to crawl up again. The browner the steak sizzled, the faster he buzzed and the oftener he bumped his head and the angrier he became. Finally — oh, joy! — he happened to alight upon the edge of a torn place in the screen. Immediately he crept through, as easily as anything. On he flitted toward the frying-pan over the fire.

Now even the most foolish fly that ever lived is not so silly as to take a bite of piping hot steak, no matter how delicious the smell. This young fly hovered as near as he dared while the steak was cooking. Sometimes he floated buzzing in the air.

Sometimes he crawled along the edge of the greasy sink and then flew across to the table without waiting to clean his feet. On a corner of the table was the peeling of a decayed banana. The fly crept over it and then walked up the side of a sticky sugar-bowl and down into the sugar. Wherever he stepped, specks of the rotten banana and other stale food, that had clung to the hairs on his feet, were scattered on the sugar.

This was unpleasant enough, but something worse followed. When the mother in that untidy family gave the baby a spoonful of sugar, she could not see the tiny specks of rotten banana on it. But they made the baby feel sick and fretful all the next day. The mischievous fly, however, knew nothing of this. Of course he had not meant to cause anybody to have colic. The trouble with him was that he was too lazy to clean his feet properly after walking through sticky refuse. It was not so much his fault as the fault of

the family who let their kitchen go dirty and their screens remain unmended. Sometimes flies carry the germs of typhoid fever from one place to another.

As for the fly's supper that evening he ate so much sugar that he lost his appetite for the steak. He had no jaws with which to bite his food. His upper lip grew in the form of a tube, with two tiny flat files at the end. When he wanted to eat, he unfolded his long tongue, scraped off a bit of sugar with his files, and sucked it up to his mouth.

That night he slept on the frame of a picture in the dining-room. When he smelled breakfast cooking in the morning, he flew toward it, leaving a black speck where he had been resting. But then there were so many fly specks already on the frames and windows that one more or less did not make much difference.

On his way to the kitchen he passed near the dining-table. Five or six other flies were buzzing around the syrup jug. He

circled nearer and nearer till he settled down on the sticky rim of the jug. He unfolded his tongue and took a sip. That was even better than sugar, because it was easier to suck. After he had eaten all he wanted, he lifted his wings to fly. But they just flapped up and down without raising him in the air. All six of his feet were stuck tight in the molasses.

That was a terrible plight. First he stood on five legs, and tried to pull the other free. Then he leaned on four and struggled to kick with the last two. He pulled and kicked and jerked and twisted. Once he dragged one foot loose, but he forgot to hold it high enough. In a moment it was stuck deeper than ever. He sank down on his side to rest an instant, and one wing was glued fast, then the other. The harder he struggled, the stickier he became and the less he could move.

At last he was almost dead of fright and weariness, and lay still. When the baby's mother started to pour some syrup on a

pancake, she saw the fly and fished him out on the tip of her fork. She shook him off into the air without watching to see where he fell. He went tumbling clumsily over and over, and dropped splash right into the baby's cup of milk.

This new adventure was not so bad as you might at first imagine. Of course he was now in danger of drowning. But very likely it is pleasanter to drown kicking in clean cool milk than to smother to death motionless in thick molasses.

The little fly, however, did not intend to drown if he could help it. As soon as he felt the milk wash over his head, he began to struggle again. And this time, happily, the more he struggled, the easier it was to jerk and twist and flap. You see, the milk was washing the molasses from his tired legs and draggled wings.

Finally he was all untangled from the stickiness and was free to swim as best he could. But alas! by that time he was so very weary that he stopped kicking and

floated quietly. Really he was beginning to drown, for he could not breathe, even if his head was held above the milk. Insects breathe through tiny holes on each side of their bodies. This fly would surely have died as he floated, if the baby had not poked at him with a small fat finger.

The instant the fly felt something touch him, he gave a flap and a kick, and scrambled up slowly over the finger. The baby laughed when he felt the crawling feet tickle his skin. In a minute he tossed the fly off into the air just as he had seen his mother do when she fished the insect from the molasses. Down dropped the fly to the floor, for he could not use his wings while they were wet. As soon as he stopped feeling dizzy from the whirl and bump, he crawled slowly under a chair and rested till he was strong enough to clean his legs and wings and rub his eyes dry. Then away he flitted toward the sunshiny window, buzzing as gaily as if he had never

known the dangers of milk and the perils of molasses.

### III. HIS VISIT TO THE GARDEN

His troubles for the day were not yet over. The baby's mother lay down after luncheon to take a nap. But the flies bothered her so much that she could not get to sleep. First one crawled over her forehead, and then another tickled her nose. A third alighted on her cheek, and a fourth crept across her hand. When the woman grew tired and cross from slapping at them, she jumped up and snatched two towels and began to drive the flies out-of-doors.

Around and around the room she went, waving the towels. Some of the flies hid behind the pictures, others crept into cracks in the plaster, others scurried on before the swirling breeze caused by the towels. Our young fly was sunning himself quietly on the window-ledge when smack! A corner of a towel snapped down close beside him and

almost killed him. Away he tumbled in a terrible hurry, banging his wings against the pane, bumping his head, and bending his feelers. He really was a stupid little creature, even if he did have six legs and five eyes and two beautiful gauzy wings.

At last he happened to get started toward the open door and was driven along by the whirling towels. Out he sailed into the sunshine and joined a swarm of other flies who were soaring contentedly above the porch steps. They floated in the air, their wings whirring softly and swiftly. Now one darted toward another, then flew apart, or circled this way and that. It was fun to be a cheerful young house-fly on a pleasant summer afternoon, especially if an untidy family lived near enough to be convenient for meals.

If our young fly had been wise enough to stay where he was happy and well fed, he might have lived till the autumn frosts numbed his busy wings. Perhaps, if he had been lucky, he might have slipped into

the house again and hidden in a cosy crack all winter till the warm days called him out in the spring. But, no, he was meant for another fate. That afternoon a breeze sprang up and the fly carelessly drifted on before it till he reached the beautiful garden.

At first he seemed to enjoy being there. He alighted on a twig of the hedge and rested for a few minutes, his wings glistening in the sunlight. Then he flitted to a flower and hovered above it, for it smelled like honey. Just as he settled upon a petal and began to unfold his tongue, a woolly black spider darted out from beneath a leaf and jumped for him. He slipped away barely in time.

A moment later he was floating hither and thither above the clean gravel path. Of course he was hungry again and hunting for something to eat. Now, would you believe it? In all that garden there was hardly a thing that he liked. There was no rubbish thrown out from the house

to lie rotting in corners. There were no spots of grease or stains from spilled food on the kitchen porch. After a long search, the fly found an apple that had fallen from



a tree and had begun to decay. He ate a little of that, and then took a few sucks at a dead beetle hidden under a tuft of grass near an ant-hill.

When the people in the house began to cook supper, he caught a whiff of something most delicious. As quickly as he could beat his wings, he followed the smell to the kitchen, and bumped against the screen door. Up and down and around he buzzed and tumbled and fluttered and crawled in a blundering hurry to get inside. But not even the smallest rip could he find in the screen.

Every time somebody opened the door, he tried to fly in but was brushed back by the careful cook. She did not want any untidy flies trailing their dirty feet over her food. Finally — sad to say! — that hungry young fly managed to hide near the knob, and just as the door was swinging swiftly shut, he tried to dart in. But alas, alas! he was one instant too late. He was caught in the crack, and he never went buzzing again through the garden.

# VI

# THE SPIDER WHO WOULD A-HUNTING GO

# VI

# THE SPIDER WHO WOULD A-HUNTING GO

## I. A NURSERY FULL OF BABIES

THE mother spider carried her nursery of babies up to the top of her hole and held it where the morning sunshine fell warm upon it. From the outside it looked like a silky yellow ball as large as a hazel nut. But inside — dear me! — you should have seen the crowd of tiny spiders tangled together. Each one was no bigger than the head of a pin, even with all his eight legs spread out. A spider is not exactly an insect, for true insects, such as the grasshopper, mosquito, butterfly and others, have only six legs.

The last baby spider, who came kicking out of his speck of an egg, had hardly

room to wriggle. Such a squirming and tickling and sprawling and crawling under him and over him and around him! He had more than a hundred brothers and sisters. When they all began to creep out of their own skins, that nursery was certainly a lively place. Some hung on to the walls, and some hung on to each other, while they pushed off their old suits with their hind legs.

Before the youngest one had finished pulling his feet free of his own ragged clothes, he was nearly buried in a heap of empty skins. He kicked his way out and caught hold of one of his bigger brothers with his claws. That kept him steadier while the others jostled and scrambled and tumbled. Their new coats were larger and hairier than their old ones. Their jaws were stronger. Close to his mouth, each baby had a pair of extra legs, or palps, which he could use like hands.

Suddenly the whole nursery began to move, bouncing the family around worse

than ever. Really, though of course they knew nothing about the dangers outside, a bird had hopped along to the top of the hole. The mother spider had felt him coming in time, and scuttled down to the deepest end of her house with her silken cocoon full of babies held tight in her legs. The youngest one clutched his brother closer and hung on till the shaking and jerking stopped. Perhaps he would have shut his eyes to get rid of the dizzy feeling if only he had had eyelids. But after all eyelids were not necessary in such a dark little round room. It had not a single window or door. The spider could sleep just as well with his eight eyes wide open.

Now very likely that is a convenient way to have your eyes, if you wish not to miss anything that may be going on. Soon — what do you suppose? — the biggest baby bit a hole in the wall of the nursery. A dim gray spot of light shone in. As soon as the youngest one saw it, he started to crawl toward it, without waiting to wonder

why he wanted to go. He pushed up beside his brother and looked out. He could not see anything except the hairs on the mother's body. The hairs on her legs were so sensitive that they seemed to hear what the little spiders were doing. She turned the cocoon over and jumbled them all safely back in the dark again.

The next morning when she carried her nurseryful up to the sunshine, the warmth made the babies feel lively. One after another, they came scrambling through the hole in the cocoon, and crept upon her back. There were so many of them that they covered her all over. The later comers climbed up on the others. Then those underneath squirmed out and tried to crawl on top of the crowd. By the time the youngest one managed to squeeze his way into the tangle of brown legs and soft dots of yellow bodies, he could not find a bit of room except on the tip of the mother's head.

When the cocoon was empty, the old

spider let it drop. She had all she could do to take care of her hundred or so children. They rode on her back wherever she went for two or three weeks. Naturally it was rather a nuisance for her to take such a large family along with her when she wanted to go hunting. If she had been the kind of spider that lives in a web, it would have been easy to sit quiet and wait for a fly or some other insect to come near enough to be caught. But she happened to be a ground spider who lived in a hole and went out to hunt for food when she was hungry.

## II. HOW THEIR MOTHER TOOK THEM OUT HUNTING

The youngest baby had a narrow escape the first time they all left home together. The mother crept to the top of her hole with the little ones riding on her back. Just below the opening she stopped to listen with the hairs on her legs. The ground above her was still. She could not

feel the faintest tap of a bird's claws, or the scurry of a lizard, or the thud of a clumsy hopping toad. Though she enjoyed hunting small creatures, she did not wish to be hunted herself. So of course she was very careful to keep her eyes open and her legs busy and her sensitive hairs alert when she journeyed away from her safe deep hole.

As soon as she was satisfied that no enemy lurked near, she crawled a few steps higher, and then halted again. The shadow of a falling leaf flitted across her and frightened her so that she scuttled back out of the light. After that she waited for several minutes before creeping cautiously up once more. The babies clung together without jostling impatiently. Though they did not understand why their mother was so slow in getting started, they felt that she was wiser than they were.

In a minute she began to move onward again. At the opening of her burrow she raised the front half of her body and

peered out watchfully. She could not twist her head this way and that, as an insect can, for she had no neck. Her body seemed to be in two round pieces joined by a slender waist. On the front half were her legs and her head. In the rear half were her tubes for spinning webs. Spiders, you know, are the champion spinners in the animal world.

Though she had eight eyes, she could see clearly only a few inches. However she really did not need keener sight. All the spiders that had lived before her had managed to get along pretty well with that kind of eyes. Her duty was simply to make the best of what senses she had, and to use them to take care of herself and her children as well as she possibly could.

After she had looked all around, she ran swiftly over the ground to a clump of grass. That was fun for the babies. The youngest one on the top of the heap clutched his claws more tightly upon those below him and tried to brace himself steady.

A breeze ruffled his hairs. The fresh air soaked through his breathing-holes into his tiny body. That made him feel so happy that he forgot to hold fast. He loosened his claws for an instant, and took a joyous little jump to one side. Alas! just as he came down lightly on the back of another brother, the mother slipped beneath a low-hanging blade of grass. In brushing over her, it scraped off the youngest spider, and sent him sprawling down upon the earth.

He lay there as if dead, with his legs curled under him. Spiders often play dead like that when something unexpected happens. In a moment he stirred and began to crawl away — that speck of a baby spider, lost in a wilderness of grasses.

What would become of him in a world where dangers might be hiding behind any leaf or pebble? If a hungry bird should spy him, or a lizard should come darting past, he would be gobbled down in a twinkling. A strong-jawed ant might leap on

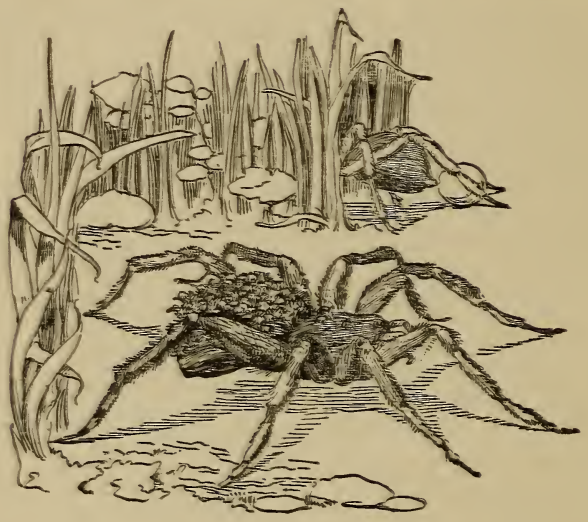
him and sting him to death, or some strange, grown-up spider might catch him and eat him. The lost baby would certainly have died somehow or other if his mother had not come rushing back.

She had not missed him. Oh, no! She had not noticed his fall, and as she could not very well count her family she would not have known it, even if a dozen or so had been scattered along her path. She had another reason for hurrying that way again. She was chasing a hundred-legged worm. Now although the worm could run fast, the spider could jump. And anyway, I should not wonder if eight long legs are better for many purposes than a hundred short ones.

However that may be, it is sure that the mother spider jumped, and caught the worm just as he was wriggling swiftly past the lost baby. When she grasped the worm with her palps, and began to eat him, the baby scrambled up on her back in a jiffy. It was a lucky adventure for

him, but not so pleasant for the worm, of course.

For two or three weeks the young spiders rode with their mother wherever she went.



The bigger they grew, the more they jostled and crowded when they climbed on her back. One day they crept all over her legs and crawled out above her eyes till she could hardly see. She raised her long fore-

legs, and brushed off about ten of the bothersome little fellows. They dropped to the ground and ran to the opening of the burrow. When the mother went inside, they hurried after her and scrambled upon her back again before she was ready to set out on another hunting trip.

After the children had changed their skins the second time, they began to be quarrelsome, perhaps because they were hungry and wanted something to eat. When the mother spider saw a red ant hurrying past the burrow, she jumped for it. The jar shook the youngest one from the edge of the crowd on her back. He picked himself up and crept near to watch what she was doing. She was drawing out cobweb threads from her spinning-tubes, and winding them around and around the ant. The ant kicked with its six legs and clashed its horny jaws, as it struggled to get free. This frightened the young spider so that he turned and scampered away as fast as he could go. But in a moment he

stole cautiously back again. Some of his brothers and sisters trotted after him.

They waited till the ant was dead. As soon as the mother had crushed it tender in her jaws, she held it while her babies ate it. To be sure, one ant was not large enough to feed a hundred little spiders, so the old spider had to work hard to catch enough to feed her family. Once she captured a big fat beetle and then they all had a feast together.

### III. HOW THEY ALL RAN AWAY FROM HOME

The youngest baby tried to stay close by the mother spider much of the time. That was how it happened that he was almost always near enough to get a bite when she caught anything. Naturally he grew faster than the others, because he was able to eat oftener. Very soon he was as big as any of his brothers, though he had hatched last of all.

By-and-by the mother seemed to get tired of feeding and carrying her children.

One morning she was so cross that she made every one scramble down from her back. When the youngest tried to climb up again, she reached for him with her forelegs and threw him several inches. She was careful not to throw him hard enough to hurt. But still, such treatment must have wounded his feelings a little. It made him wish to run away from home the first chance he could find.

He did not need to wait long, for even if the mother did have eight eyes she could not watch a hundred babies every minute. That very afternoon he crept from the burrow and ran to a stem of grass. First he touched the root with the spinning-tubes at the end of his body. Out of the tubes flowed a thread of cobweb silk. As he crawled up the grass, the thread lengthened behind him. When he had climbed a few inches, one of his brothers followed him, clinging to the first thread, and drawing another after him. Then came a dozen others, each one adding a new thread to

the line that reached from the ground up along the stem.

When the leader reached the top of the grass blade, he walked around on it, still drawing out his silken thread. This was lucky for him, because the wind was swaying the grasses so hard that it shook him off. Instead of dropping straight down, he swung at the end of his thread. He lowered himself slowly by spinning it out longer inch by inch.

He chanced to land near the home burrow and hurried inside just as his mother was spinning a door over the opening. She could feel that the night would be cold. and so she wanted to keep the children shut up safe within the warm hole. Doubtless she had seen the dozen runaways go scampering off toward the grass. The youngest squeezed under the edge of the new door and ran to join the others at the lower end. He was the only one of the wanderers who found his way back.

After that. whenever the mother spider

opened the door on a sunny day, some of the children would run off and never come home again. Each one wanted to make a home of his own, and live by himself.

One sunshiny autumn morning the youngest spider started out alone without saying good-by to his mother or the half dozen little fellows who still followed her around. He trotted off past the clump of grasses and under a gooseberry bush. Just as he was crawling over a twig, he happened to look up. There close beside him he saw one of his sisters digging a burrow. She had that moment come out of her tiny hole, with a speck of earth in her jaws. Her brother ran nearer to see what she was doing. Instantly she dropped the speck of earth, and sprang forward to chase him away. She did not wish to be bothered by any of the family now that she had her own home.

The visitor scampered on in a hurry. He did not see any use in trying to stay where he was not wanted, especially as his

sister was bigger than he was. When he reached the next bush, he went exploring hither and thither till he found a spot of soft moist earth. Here he dug a burrow of his own. He dug it by biting out specks of soil and carrying them to one side in his jaws. He knew how to do it without being told. Although he was so young, he could do everything that his mother could.

Perhaps you would not find it very thrilling to live alone in a hole under a gooseberry bush for weeks and weeks. But this spider had some exciting adventure nearly every day. He spent his life in hunting or being hunted. One morning a robin pecked the hole open. If she had not had her bill full of earth when the spider scuttled out she would surely have snapped him up. He had but a moment to scurry under a clod.

Another morning, when he was wandering around an ant-hill, hunting for tiny red ants, he was almost caught by a lizard.

More than once he was chased all the way home to his hole by some big hungry old spider. Many a time he scuttled into hiding, every leg shaking with fright.

Now, would you believe it? Spiders are very good friends to the green growing things in a garden. They eat the tiny insects that suck the juices of plants. They catch little caterpillars that gnaw the tender leaves. They devour small beetles and bugs that nibble the roots. That is how they help the garden to grow. This is why you should be kind to spiders, for they rarely bite people. They do not crawl over the food in the pantry as flies do. They do not care to sting you as mosquitoes do. If you will look at them closely, you will see that some of them are beautiful, with glistening colors.

### IV. HOW THEY FLEW WITHOUT WINGS

As the days became shorter and the nights cooler, our little spider stayed underground in his burrow more and more of

the time. One afternoon in October he felt the sunshine warm above him and crept out in search of adventures. Perhaps he was tired of living in the same hole week after week. And anyway he was getting too big to slip inside easily.

He set forth on his travels without a look behind. If he had looked behind, he would have seen something to worry him. A slender wasp was peering about under the dead leaves that had fallen from the bushes. She was hunting for spiders. By the time she reached the empty little burrow and peered within, its lucky owner was halfway up the stalk of a hollyhock that grew beside the hedge.

Here and there, between a leaf and the stalk, he found a cobweb barring his path, and crept cautiously out around it. One of the webs was triangular. One was round as a wheel, and in the middle of it hung a big black and yellow spider with her feet resting on the silken lines. If he had stepped on one of them, she would

have run toward him to see if anything good to eat was entangled in the sticky lines.

A few inches above this spider's home, one of her children was spinning a web about the size of a silver dollar. He had fastened three threads in the shape of a triangle between a leaf and the stalk. He was running busily round and round, drawing out new threads and weaving them in the form of an uneven spiral. Some time you ought to watch a spider spinning a web.

Our little fellow who was climbing up the hollyhock was not much interested in webs, as he liked better to live in a hole. He did not stop to look, but trotted to the tip of a leaf that touched the hedge. Over he jumped and hurried on till he was at the tiptop of the highest twig and could climb no farther. Then what do you imagine he did? He stiffened his legs and raised the end of his body where the spinning-tubes were. From the tubes came a

ray of threads that floated out in the breeze. Longer and longer it blew up above him till it pulled harder than he could hold. All at once he loosened his eight claws and sprang into the air. Away he went sailing across the field with the lines of silk streaming in the wind. He was flying upside-down, with his feet clinging to a tangle of delicate threads.

That was almost as much fun as having wings. The sun shone, and the breeze blew, and the air glistened with floating threads of young spiders out a-flying that autumn afternoon. There were all sorts of spiders that had come from all sorts of homes. Some lived in holes, some lived in webs, some lived in cracks of wood, some lived under stones, and some lived on trees or bushes, or in the grass. When our little wanderer went sailing over a fence, he was almost near enough to see dozens of others running and jumping in frolic at each other while they were getting ready to spin out their threads for flying.



"THERE WERE PERILS IN THE AIR AS WELL AS ON THE GROUND."

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Away and away, higher, higher, higher, above the fence, above the bushes, above the tops of the tallest trees, he sailed. But there were perils in the air as well as on the ground for adventurous little spiders. Once a bird darted toward him with such a rush of wind from her flapping wings that he was blown just beyond reach as she snapped at him.

Perhaps that narrow escape made him feel that he had been flying long enough, so he began to draw in the floating threads. With his jaws and palps and fore-feet he wound the silk into a flossy ball at his mouth. As the lines grew shorter, the wind could not carry him along so lightly as before. Slowly he dropped lower and lower till he swung against the tip of an oak leaf, kicked his legs free from the tangled threads, and scampered down the trunk.

He found himself in a grove of trees far from the beautiful garden. Of course he did not know how far he had travelled,

or where he was. All that he could see was a small space of rough gray bark with brown leaves lying around it. He slipped under a leaf and crawled beneath an acorn to rest till morning.

The night was so cold that frost gathered thick and white on the ground. Even in his snug corner the little spider felt chilled. He lay curled up in a tiny ball till the sun had melted the frost on the wet, glistening leaves. Then he crept out and caught a beetle for breakfast.

After that he was strong enough to dig another hole. This was to be his home where he would sleep all winter long. So he dug it deeper than his other burrow, and made a door of bits of twigs woven together with silk. After he had gone inside, he fastened the door down over the opening with threads. Now he was ready to curl down safe and warm in his house and sleep till April sunshine thawed the ground above and called him forth to go once more a-hunting.

# VII

# THIS IS THE HOUSE THE ANT BUILT

# VII

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## I. HOW THE HOUSE WAS BEGUN

IT was an exciting day for the little brown ants that lived in the meadow. Out of every doorway in the hill they had come swarming. Hither and thither scurried the small, wingless ones, now darting this way, now rushing that way, as they prodded, and pushed, and pinched the large, winged ones to make them hurry faster. Those without wings wanted the others to fly away and start homes for new families of ants.

The first winged ant that went running down from the round hillock scampered up a lily leaf as fast as she could move her six nimble legs. No wonder she was

in haste. Every time she stopped for an instant, the little one behind her poked her with a hard tiny head or nipped her with a pair of horny jaws. Up she scurried to the tip of the leaf, and opened her gauzy wings that flashed in the light. She kept raising and lowering them uneasily, for she wished to fly, and yet she was almost afraid, for she had never flown before.

All her life till this summer day she had lived in the pleasant dark rooms of the nest under the hill, except when she was brought out with her winged brothers and sisters to play on a pebble or swing on a grass stem in the sunshine. On those other days the wingless ants had taken care of her and fed her and coaxed her back into the nest again. But now they were trying to drive her away. And strange to say, she was eager to go! She longed to fly up, up, up into the warm bright air above the meadow.

On the edge of the leaf she hesitated,

her wings quivering. Then came the nip, nip, from behind. She swayed to and fro, her feet unclasped their hold, and she soared slowly above the lily. She was



flying! From other leaves and grasses near by flitted her brothers and sisters. Soon the air was alive with winged ants, — rising, falling, dancing in and out of the swarm. They drifted onward with the wind as they fluttered and whirled.

When the sun went down and the chill of twilight began to numb the restless tiny bodies, one by one they dropped to the ground. The one who had first climbed the lily leaf tried to creep under a twig to hide for the night, but her trailing gauzy wings caught on a splinter and jerked her backward. When she started to squeeze beneath a stone, they held her back again. Somehow she knew that she would never need them for flying any more. So she broke them off. She flapped them back and forth and pulled at them with her feet. She rubbed against pebbles and twisted suddenly this way and that till finally the frail wings snapped off and lay tattered and torn on the ground. Then she slipped beneath the stone and rested till morning.

Though she was tired from her flight, she did not sleep quietly. She lay on her side with her two big eyes and three little ones wide open, because, you see, she had no lids to close over them. Once in a

while she lifted first one foot, then the other. Perhaps if an ant can dream at all, she was dreaming of the busy days to come. Now and then her body twitched nervously, and her slender feelers quivered in her sleep.

In the early morning she began to awaken. She stretched out her head; next she lifted a leg and shook it. In a minute she scrambled up on all six legs and walked toward the light shining in under the edge of the stone. There she stopped to yawn and clean herself before beginning work. She licked her face and head with her tongue, as a cat does. She drew her legs between her jaws to wash them. She combed her feelers with her forefeet. Then she started out to find a good place to build her house.

Now, though she did not know it, she had chanced to drop to earth right in the middle of the beautiful garden. The stone under which she had been sleeping lay near the gravel path. She ran this

way and that, touching with her sensitive feelers first one pebble and then another. The ground seemed too hard for digging easily. You see, she had no shovel or pickaxe to use; she had only her horny little jaws for biting up the specks of dirt, for carrying them away, for getting food, for fighting, and for whatever else she had to do.

After she had decided that she did not like to dig in the path, she hurried on to a bed of vegetables. But the soil there had just been raked over and was too loose to suit her. It would have caved in if she had tried to make a tiny tunnel through it.

At last she found exactly the spot she wanted, close to the edge of the path. It was neither too hard nor too soft, neither too moist nor too dry. It was not too sandy, or too clayey, or too marshy.

Without pausing to rest and wish for somebody to help her, she started to work. She bit out a mouthful of earth and laid

it down a little way off from the beginning of her house. Soon the soil was piled in a hillock of crumbly brown specks all around the hole. She carried each new mouthful up to the top and let it roll down the outside. So she kept on biting up bits of soil, carrying them up to the entrance and letting them roll away.

### II. TAKING CARE OF THE BABIES

When she had dug down far enough, she hollowed out a tiny room and laid an egg not nearly so big as the head of a pin. Then she was busier than ever. What with laying new eggs, carrying them up into the sunshine when the day was cold, or down into the shady nurseries when the air was too hot outside, what with cleaning the house and digging new rooms, she really did not have time to eat.

In two or three weeks, a baby ant was hatched from the first egg that she had laid. It looked almost like the egg itself,

except that the baby's body had a small groove around it, just below its head. It was like a soft white worm. The mother fed it with food from her own mouth.

Now she could hardly find a moment, even to sleep. When she was not feeding the baby, or brushing and washing it with her tongue, she was carrying the eggs from one room to another, or licking them to keep them from getting dry and hard. All day long and most of the night her six busy legs trotted up and down, to and fro, in and out, till they fairly ached from weariness. Whenever she had a spare minute she dug her house a bit larger and laid another egg. It takes a great deal of work to be the mother of a whole ant-hill.

By the time there were six little ones hatched, the eldest was ready to fall asleep and change to a grown-up ant. It must have been a relief to the mother when the baby stopped eating and began to spin a web over her own body. After

she was covered all around in a safe warm shell of silk, she curled down quietly and slept for almost four weeks. While she slept, the tired little mother kept on working harder than ever. She would be glad enough to have a grown-up daughter to aid her by and by.

At last one day the mother noticed that the cocoon moved and almost turned over. Something was stirring inside. She came running swiftly to help the young ant crawl out. She unfolded the six legs which had been doubled up in the narrow cradle. She smoothed the threadlike feelers, placed some food in the hungry new mouth, and licked the soft skin of the slender body. Then she must have told this eldest child of hers to hurry and take care of the other babies.

Yes, there were dozens of babies in the nest by this time. Some were fast asleep in their cocoons; others were getting ready to spin the webs around themselves; others were still soft squirming little

worms. The young ant began at once to run hither and thither in her eagerness to help.

She was nervous at first. Once she dropped a baby when she tried to carry it from one room to another. To be sure, the child was not hurt because she had such a very short distance to fall from her sister's tiny jaws to the floor. Still, the young ant was not such a good nurse as the mother. Sometimes while she was licking her baby sisters, she made a mistake and gave a nip that caused them to wriggle and squirm. When she started to feed one, as her mother did, by patting it on each side of the face with her antennæ, and then laying its lips against hers to drink the sweet liquid from her mouth, it twisted away as if she had squeezed it too tight.

However she kept on trying, and by the time that two other sisters had been helped from their cocoons, she could take care of the babies very well. Indeed, the

mother began to leave most of the work to her daughters now, while she spent all her time and strength in laying fresh eggs.

### III. FEEDING THE FAMILY

One morning the eldest sister set forth to hunt for food. This was not her first trip out-of-doors, for she had often carried eggs up to the warm air above. Now she was going alone on a journey, and perhaps she would never come back. The beautiful garden was to her a world of dangers. A bird might snap at her; a spider might spring upon her; or somebody's heavy foot might crush her flat.

She was not afraid, however, doubtless because she did not stop to think of what might happen. Away scurried the little brown ant down the little brown hill. She ran across the path, her head bent toward the ground, her feelers touching every pebble and twig within reach. Now she scrambled over a bit of gravel; now she

squeezed beneath a stalk of grass; now she trotted around the edge of a monstrous chasm made by some human person's heel. Such a chasm may not seem monstrous to you; but then you must remember that you are much bigger than an ant.

On the other side of the path she hurried forward zigzagging this way and that through a wilderness of grasses that stretched around on every side for inches and inches. Indeed it was a forest as long as the path itself and as much as two feet wide. At its farther border the ant smelled something good to eat. She stood still for a moment, and twitched her feelers so that she could tell from which direction floated that delicious fragrance.

Ah, now she knew! Hurry-skurry, she scampered toward the stem of a lily plant. There in a small hollow at the root lay a tiny fly that had been drowned by a sudden shower while he lay asleep in the lily-cup above. His body had been

washed down the stalk to the hollow. The ant sprang upon it and lifted it in her jaws.

Dear me! but it was heavy, and so much bigger than she was herself that she could hardly balance it even when she propped it with her forefeet. She dragged it toward home very slowly because it was so big and she was so little. She had not noticed before how rough the path was. Now the dead fly's wing caught on a grass blade and almost jerked her back in a somersault. Now it had to be pulled and hauled over a pebble. Now it needed to be lugged toilsomely all the way along one side of a fallen twig, around the end and up the other side.

The ant was tired out when she reached home at last. And then, after all that trouble, to find that the fly was too large to go into the nest! Perhaps if she had been a little girl, she would just have sat down and cried. But being an ant she

trotted into the hole and called her sisters to help. She could tell them things by rubbing her feelers against theirs. Two of them followed her outside and gnawed off the fly's wings so that he could be dragged down into the dining-room.

The next day she started out to hunt for honey. At first she tried to get it from flowers. It seemed as if she was always in a hurry; you could guess that from the zigzag, nervous way in which she ran hither and thither. It really was too bad that she wasted her time over the flowers. The first one she visited was a yellow snap-dragon. When she reached the tip of the stem, she found that the pretty petals covered the golden heart where the honey was hidden, and she was not strong enough to push in.

Then she trotted off to a verbena. When she began to climb up the stalk, she kept running against the sharp points of tiny hairs. Every time one tickled her eyes or brushed her feelers, she seized it

in her jaws, because she thought it was something trying to fight her. This made her so cross that she turned and scrambled to the ground.

Next she began to creep up a milkweed, but her claws cut through the green stem and sticky white juice flowed out. She could hardly pull her claws free and struggle away. The dirt on the ground stuck to every one of her claws so that she had to stop and clean them. The last blossom that she visited was one with petals curving outward all around the heart. When she tried to climb over the slippery edge, she slid and tumbled off. After picking herself up, and shaking her legs to see if any were broken, she gave up seeking honey from flowers. It was better for the flowers to be visited by bees instead of ants, because a bee sucks honey from only one kind of plant at a time. If the flowers grew so that ants could run from one to another, the yellow pollen in their hearts would get

all mixed up, and that would be bad for the seeds. You will learn more about this when you study botany.

Now where do you think the little ant went to find honey to take home? First she climbed a tree to explore. Such a long way up, and the bark was so rough that she had to stop and rest several times. It was hard work to clamber up bumps as big as mountains to her, to go scrambling down into cracks like deep valleys, or to run zigzag along the edge of a tremendous precipice half an inch high. When she reached the first branch, she trotted out on it, twitching her feelers now to one side, now to the other.

In a few moments she saw a tiny green bug standing with its head bent as it sucked the juice of the tree. She hurried up behind it and waited till a drop of something like water oozed out at the end of the small green body. The ant put her mouth close down and swallowed the drop quickly. It tasted sweet as the

honey from flowers. As soon as another drop appeared, she drank that too. Then she stroked the bug's back gently with her feelers till a third drop oozed forth. That was how she milked the little green cow.

There were other ant cows, or aphids, as their real name is, on the branch. The brown ant went from one to another till she was so full of honey-dew that she looked as round as a bubble. Then she trudged away down the trunk and back through the garden to the nest in the little brown hill. One of her sisters ran to meet her. The honey-bearer rose on her four hind legs with her front legs outstretched and her head lifted. The other stood up in the same position and pressed her jaws against her sister's till a droplet of honey flowed from one mouth to the other. Two or three others came to drink a drop or two. Then the honey-bearer pushed past them and crept into the house to feed the babies and the mother ant in the same way.

### IV. HAPPY DAYS AT HOME

So the late summer slipped by. There was always work for everybody to do. The mother ant kept laying eggs. The eggs kept hatching into soft white hungry babies. The babies ate and grew till they were ready to spin their own cradles and fall asleep in the wonderful sleep that changed them to nimble-footed workers. The busy young workers nursed the babies, fed the mother, took care of the eggs, dug the house larger, milked the cows, hunted for small tender caterpillars and dead flies, gathered seeds to store for the winter, and once in a while went out to fight the ants from another nest.

One day a little sister discovered a trail of molasses that the grocer's boy had spilled on his way to the back door of the house at the end of the garden. She hurried home to tell the others. Soon a long line of ants were coming and going, one behind the other. They followed always the same path, winding between the

grass stems, around the pebbles, across the walk and up the porch steps. The ants who were marching to get more molasses waved their feelers when they passed those returning with their burden of sweets. Though ever on the alert to spring upon a stranger and tear and bite and wrestle, they were kind and helpful and affectionate to all those belonging in their own nest.

They worked steadily all the morning and were still trudging back and forth in the afternoon. Then something disturbed them. Suddenly those who were crossing the path stopped, waved their feelers, broke from the line, ran uneasily this way and that, and finally scurried off in all directions. From around the lilac bush came marching an army of big red ants. They did not move in step side by side, but pushed on close together in a long narrow crowd of hundreds and hundreds. Forward they pressed without paying any attention to the frightened brown

ants. They were on their way to a nest where some black ants lived. So on they journeyed over the path, across a flower bed, under the hedge and zigzag over a broad rock to the foot of a tree.

The black ants saw the red ants coming and began to run hither and thither. Some scampered away to hide in the grass or climb up weeds for safety. Others scuttled into the nest and tried to carry the eggs and babies with them as they fled to the deeper rooms underground. The big red ants rushed up the hill and dashed in at the doorways. They went straight to the nurseries, but they did not kill the young ones.

When they came out, some were carrying eggs; others had the soft little wriggling wormlike babies in their jaws; others were holding the cocoons in which slept those who were changing. They were taking to their own home these children of the black ants so that they might have servants to work for them. When

the captives grew up, they took care of the red ants' eggs, and nursed their babies, and kept the house clean.

The brown ants, however, who had been busy with the molasses, knew nothing of this dreadful robbery. They never stole other ants' babies. They preferred to do their own work and attend to their own children. This was all the better for them, because work made them stronger and healthier, and very likely happier too, than the lazy ants who kept slaves.

When the autumn days grew cooler the little brown ants seemed to become dull and drowsy. The mother ant laid fewer eggs. The nurses were less careful to carry the eggs from one room to another every day. The soft white squirming babies lay quiet, without eating, for hours at a time. The young ones, shut close in their cocoons, slept longer and longer. The workers who went out to find food for the nest moved more slowly and came trudging home sooner than they had done

during the warm summer weather. The tiny green cows on the trees and plants were nipped with frost and died. But some of their eggs had been taken away by the ants and hidden safe in the deep rooms underground, where the cold could not reach them.

Winter clouds sifted snow over the ant-hill, and icy winds blew through the bare garden. In their house with its winding galleries and wide halls the queen dozed beside a heap of her newest eggs. Now and then a nurse crawled slowly to the piles of seeds in the store-room, and took a listless nibble here and there. Then she crept back among the sleeping babies to watch for any who might wake up hungry for a moment.

When the spring sunshine thawed the frozen soil, the ant-hill began to stir with fresh life. The mother began to lay eggs faster. The babies began to squirm and wriggle with impatience to be fed oftener. The sleeping young ones began to kick

in their cradles, eager to escape. The busy workers ran to and fro in the biggest kind of a hurry.

No wonder that they felt nervous with all the work to do! What with caring for the eggs, and watching the babies, and cleaning the house, and digging new rooms, and hunting for food, and tending the little green cows, they were almost worn out before darkness gave them a chance to rest. Indeed, at some specially busy times they worked late into the night.

This summer brought them an extra task. Among the young ants waking from their long sleep were a number of brothers and sisters with wings. These did not help with the work of the home. They did not even take care of themselves, but were fed like babies. Once in a while they were coaxed to go outside and play in the fresh air. They crawled along a grass blade till it swayed up and down beneath their weight, while they

clung to it as if swinging for fun. Sometimes they chased each other around a pebble, or stood on their hind legs and waved their feelers and clashed their horny jaws. Perhaps they felt that it was much pleasanter to be a winged ant than a busy little worker always in a hurry-scurry over something that had to be done.

But alas for their lazy days! One afternoon they were all driven from the nest, just as their mother had been pushed away from her first home the year before. The wingless ones nipped and prodded and poked them till they spread their filmy wings and flew up, up, up into the warm afternoon air. Swarms of winged ants from other nests joined them, and away they drifted, whirling and dancing with the breeze.

After the joyous flight was over, here and there they dropped to the ground. But only a few from the hundreds in the flashing swarm lived to start new nests

the next morning. Many of them had been snapped up by birds and bats and dragon-flies as they danced in the twilight. Many had died of cold during the night or been gobbled by watchful spiders and solemn fat toads. Still, in spite of such perils, dozens and dozens of new little brown houses began to be built along the road and in the meadows that late summer. And back in the old nest by the garden path the little brown ants worked as busily as ever all day long.

# VIII

# HOW DOTH THE LITTLE BUSY BEE

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## I. NO TIME TO PLAY

THE young bee was beginning to wake up from her long sleep. She stirred uneasily. Her four filmy wings that lay folded damp and soft at her sides quivered, and her six slender legs uncurled their tiny claws. She lifted her head and moved it to and fro. Close around her pressed the smooth walls of the waxen cell of honeycomb in which she was lying.

Two weeks earlier she had gone to sleep a fat little baby bee like a white worm, and now she was waking up a grown bee with wonderful big eyes for seeking gaily-colored blossoms, with a long tongue for sucking honey, with jointed feelers for touching

and talking, with wings to bear her through the garden, and with legs that she could use for walking and clinging, for combing and brushing, and even, like baskets, for carrying the yellow pollen dust from the hearts of the flowers to the hive.

Very likely she was not in the least surprised at the change, for bees always change in that way. It would have been most remarkable indeed if she had stayed just the same from the first day to the last of her nap. But if it had been you, that of course would be different. Suppose you should go to sleep a soft white worm and wake up a gauzy-winged bee? Wouldn't that be surprising!

Well, the first thing that young bee did with the little jaws of her new head was to bite a hole through the waxen curtain that covered the outer end of the honeycomb cell. Then she poked her head through and looked around with her big eyes. It was dark there in the middle of the hive. Above and below her stretched a wall of

honeycomb from ceiling to floor. Opposite her, so near that she could almost touch it with her feelers, another wall like that in which she had lived all her baby life reached also from ceiling to floor. No wonder it was dark in that narrow passage, especially as the one little door of the hive was so far away beyond the nursery honeycombs that she could catch only a glimpse of a faint ray of light stealing in from the sunshiny morning outside.

In the dusk around her something was moving. She could see dim forms of many bees crawling over the honeycomb. Two or three of them climbed up to her. One gnawed the hole bigger so that they could help her squeeze through to the outside. She clung there, weak and pale, digging her claws into the wax, while her nurses licked her with their tongues and brushed her with the brushes on their hind legs. Another brought a drop of honey and laid it in her mouth. As soon as she swallowed it, she began to feel stronger. It was her

first taste of food since she had fallen asleep so many days before.

While she rested, waiting for her wings to dry and her legs to cease their trembling, the nurses pushed into her empty cell and cleaned away the bits of wax, the bee-bread, and the silken threads which she had spun over the inside of the door. They were making it ready for another egg out of which would hatch a new baby. After they had finished this work, they went creeping onward to other cells where other babies were lying, some squirming hungrily, some curling down for a nap, some ready to bite their way out. The new little nurse crawled after them. She did not even think of stopping to play a little while she was young. She was eager to begin to help with the work of the hive.

Such a busy time as she had for the next week! There were hundreds and hundreds of babies, each in its own tiny cell. There were hundreds and hundreds of nurses, for every young bee went to work nursing as

soon as she woke from her long sleep and found herself changed to a grown up bee. Nursing was the easiest work of all, and that was why the youngest ones did it till they were strong enough to go out to gather honey from the garden.

However even the easiest work in the hive was not much like play, though it was certainly interesting. Our little bee had not a minute to spare. Now she poked her head in at the open end of a cell to see if the egg there had hatched yet. If a new baby was lying curled down in the end of the waxen cave, she reached down to lay her mouth against its lips and feed it with food already digested in her own stomach. This special food is called bee-jelly, and is fed to every baby worker for the first two days of its life, and to a queen all her life.

Perhaps the next thing this nurse did was to climb to the honey-cells at the top of the hive to bring a drop of the sweet liquid to one of the older babies. Or it

might be that her part was to visit the comb where the pollen dust was kept, and to carry a speck back to mix with honey to make bee-bread. Now she packed a bit of bee-bread down beside a big baby who was ready to go to sleep. Then she aided in closing the open end of that cell with a curtain of wax so that the sleeper would not be disturbed during the wonderful nap. Now she clung in front of the closed cell and beat her wings till she felt hot enough to melt. The warmth of her body, added to the warmth from the other small nurses who were dancing and fluttering beside her, heated the air near them. This heat made the baby asleep behind the curtain change faster than while it was cool. A few moments later she was hurrying with the others to help a newly awakened young bee out of the cell, to lick her furry coat, to brush her and comb her and lay a drop of honey on her tongue.

### II. OFF ON FLASHING WINGS

And at last, after a busy week of this, how strange it was the first time she went flying! She did not go alone, for almost all the other nurses who were just her age started out the same day. Since the queen bee laid many dozens of eggs every day, of course dozens of babies hatched at about the same time and grew up together. Such a crowd of them as went creeping over the nursery honeycombs toward the entrance that sunshiny summer morning!

They crawled out upon the platform in front of the door. Our little bee was afraid of the light at first. The two large black eyes on the sides of her head shone like jewels. These two remarkable eyes were really made up of six or seven thousand single eyes close together. In the middle of her forehead was a group of three simple eyes. No wonder the sunshine seemed dazzling to her after the dusky shadows of the windowless hive!

Perhaps she trembled for a moment and moved closer to her sisters. Surely the world outside the hive was very big and bright and terrible. Surely it would be safer to slip back again into the warm, dim, friendly darkness of the hive. It may be that she turned and lifted her wings to help her hurry faster. And then — and then — it was the queerest thing! Somehow the two upper wings hooked upon the two lower ones, and were held spread wide open. She flapped them once, twice, gave a little leap upward, and away she went sailing through the air.

The fresh air flowed into her body through the tiny breathing holes on each side. This made her feel light and clean and joyous, even though she could not quite get over her instinctive fear of being separated from her sisters in the crowded hive. After a few circling flights over the bushes near-by, she alighted on the platform and, unhooking her wings, folded them as before and crept back to her work

in the nursery honeycombs. It was not until a week later that she set forth on her first visit to gather honey from the flowers in the garden.

How sweet the air was that beautiful morning! Any bee could tell, just from smelling of it with her feelers, that flowers were unclosing gay petals from over their golden hearts everywhere in the garden. Our little bee crept out of the hive and paused on the platform. Did she know that she was going to get honey? Who had told her that she must seek it in a flower instead of in a waxen cell of honeycomb where she had always found it before? How did she know what a flower looked like? She had never yet seen one in bloom?

Perhaps she did not know where she was going or what she was seeking? All that she knew was that she wanted somehow to spread her wings and fly away from the hive. Many bees were humming about the platform. Some were starting out and others were returning. Almost before she

could make up her mind to follow one or another she found herself flitting upward. A moment later she circled and darted back again in fright. What if she should lose her way in the wide sea of light and air that reached to the skies? Again and again she set forth, only to swoop quickly home after a short timid flight. At last she rose high, with her head turned toward the hive, and hovered there, looking around at the garden below her. She wanted to be sure to remember the path back. Then off on flashing wings she went to her new work.

### III. HURRAH FOR THE HONEY!

This was different from pushing through the crowds in the dim shadowy hive. She went soaring, now up, now down, now in long dipping flight hither and thither! There was no danger here of bumps and bangs and bruises against other hairy little bodies crawling close together over the combs.

Across the lawn she flew toward the flower beds. A fragrance floating upward made her feelers quiver. Her shining eyes saw spots of bright color where the marigolds opened their yellow blossoms in the sunshine. Darting nearer she hovered above them, her wings buzzing against her body. Suddenly she dropped upon a blossom and thrust her tongue down into its golden heart. Her little black tongue went wriggling in and out of its tube as she lapped up the honey in the flower. She swallowed the sweet liquid into her tiny honey-sac, and then flitted to another blossom.

When her sac, which held as much as a small drop, was full, she rose high above the marigolds and flew straight to the hive. Bees always take the quickest way through the air when they are headed for home; and that is why people call the shortest straightest path to anything a bee-line.

When she reached the hive she crept inside and went to empty her honey into one

of the clean new wax cells near the edge of the comb. This fresh sweet juice, or nectar, is more watery than honey ought to be. So, while some of the bees keep bringing in nectar and pouring it into the cells, others work over it, fanning their wings to and fro just as the young nurses do to help warm the babies who are changing in their sleep. The warmed air blows over the nectar and dries up part of the water. Then the bees squeeze from their heads a few drops of something that keeps the honey from spoiling. After that they cover each full cell with a thin curtain of wax to keep it safe for the winter.

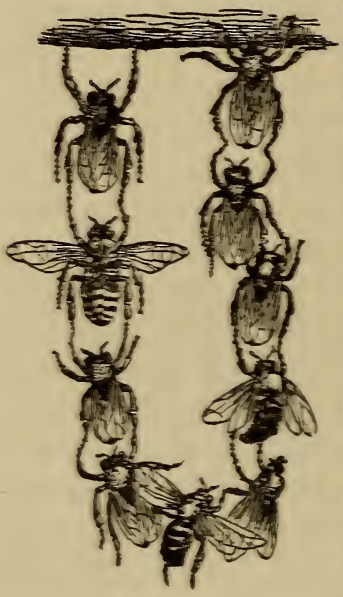
The next morning our little bee went out to gather pollen-dust for the nurses to mix with honey in making bee-bread for the babies. This time, instead of lapping up nectar, she tumbled about in the yellow center of a flower till the pollen grains stuck to the hairs on her legs and body. Then she rubbed the little stiff combs on her hind legs over her body and scraped

off the pollen in two pasty balls. On the outside of each hind leg was a small hollow spot bordered with hairs. These were the baskets in which she carried the balls of pollen as she flew home. They were so heavy that they dragged her legs down. She had to flap her wings hard to travel with such a load.

When in the hive again, she crawled to a cell near the nursery, and stood with her hind legs in it. She pushed off the balls of pollen with her middle legs, and other bees smoothed it down while she hurried out again to get more. On each journey she visited only one sort of flowers, so that the pollen in her baskets was all of the same kind. This was exactly what the flowers needed to help them to form good seeds, as you will learn when you study botany, but I cannot explain it to you now.

After the young bee had worked a few days at gathering honey and collecting pollen, she stayed in the hive one afternoon to make wax for new honeycombs. This

task really was hardest of all, though it looked easy enough. She climbed to the ceiling and hung there by the claws of her front legs. Another bee crawled up and clung to her, and another caught hold of that one, and so on until there was a chain of bees hanging still in the dark. Others climbed up beside them and swung down other chains which tangled together in a mass of little warm bodies. The longer they hung there, the warmer they grew. Our bee felt drowsy and numb, waiting and waiting, almost asleep. Tiny claws of her sisters clutched her hair and her legs.



She could hardly breathe in the close-packed crowd.

And slowly, slowly, while she clung there without moving, four specks of wax formed in the four tiny pockets on the under side of her body. It was almost as if she perspired wax instead of salty water, as you do.

Then, one by one, the bees crawled out of the mass and took the scales of wax from their pockets and chewed them soft. The first one stuck her bit of a lump to the roof. The next one added her speck and the next and the next did the same, till there was a little knob of wax hanging from above.

After that, another bee climbed up to it and scooped out a small hole on one side, while others scooped out a hole on the opposite side. The wax-makers kept bringing more wax and building it on to the comb; and the other workers kept digging new cells. At last a whole new comb hung there ready to be filled with honey.

### IV. MOVING DAY

Meanwhile, back in the dark nursery, the big queen bee went creeping from empty cell to cell, and laying an egg in each one. A number of working bees followed her everywhere, feeding her on the purest honey, cleaning and brushing her, and watching her night and day. If anything should happen to the queen there would be no more eggs and no more babies to grow up and help with the work of the hive.

Now, of course, a queen bee cannot live forever, even if she may live four or five years. It was wise to have a young queen ready to take her place whenever she might die. Generally there was more than one little princess growing in the hive. It was the oddest thing! When the bees wanted to have a new princess, they simply made a special big cell for one of the ordinary eggs. The baby who hatched from it was fed on bee-jelly all her life, instead of partly on bee-bread. And wonderful to think! Dur-

ing her long sleep, instead of changing to a small worker with a tongue to suck honey from the flowers, with brushes on her feet, with pollen-baskets on her legs, and with wax-pockets on her body, she waked up a big queen who could do nothing except lay eggs.

It chanced one day that a young princess was ready to gnaw her way out of her cell, while the old queen was still living. There is never room for two queens in one hive, so what do you suppose they did? The old queen flew away with thousands of the workers to begin a new home.

This was how it happened. The hive was getting more and more crowded every day as more young bees kept gnawing out of their cells. Our little bee could hardly push through her sisters who were creeping about the doorway. Her neck fairly ached from prodding those in front of her this way and that. While she was busy emptying her baskets of pollen, the hurrying nurses bumped into her. When she brought

in honey, the lazy drone bees, who never worked, jostled against her in their greedy haste to steal a mouthful. If she was busy cleaning the floor or plastering up cracks with gum from certain plants, she had to step aside every moment to let one or another pass. Whenever her task was to help keep the air fresh by standing near the door and clutching the floor with her claws while she beat her wings to and fro, somebody was always banging into her. It seemed as if she really did not have room to turn around except when she could escape into the wide spaces of the garden.

One beautiful morning our little bee awoke as usual and crept toward the door in readiness to set forth to gather honey. But those who generally guarded the entrance and greeted every passer with a wave of their feelers seemed to be excited over something. They were running to and fro nervously. Others were crawling in and out without bringing any burden from the flowers. Behind her in the hive thousands

of bees began to suck honey from the open cells where it was stored. Each one took enough to last several days, for they would have no time to visit the garden when they were starting their new home.

After a while some of them spread their wings and began to fly round and round inside the hive. The queen rushed from the nursery and dashed hither and thither as if she were crazy. Finally she ran through the doorway and, lifting her wings, flew upward. Pouring out after her came the throng of her followers. They flew with her, circling and drawing closer and closer in a swarm of vibrating little bodies and glistening gauzy wings. When the queen alighted on a tree and held quiet, the others came to rest around her and hung there, clinging to one another in a living cluster.

Presently a few of the bees loosened their hold and started off to hunt for a hollow in a tree or wall where they could live, plastering up the cracks and hanging curtains

of fresh honeycomb for a nursery and store rooms.

Meanwhile back in the old hive our little bee found herself amid those who had stayed behind. Then indeed she had to work harder than ever in her life. Though the workers were so much fewer than before, there were just as many babies waiting to be fed, just as many greedy drones eager to steal honey. A new queen was almost ready to begin to lay eggs. And besides all that, more honey must be gathered and stored for the winter that was coming.

### V. WAITING FOR SPRING

As the days became cooler, the bees did not work so hard as during the summer weather. The queen laid fewer eggs. The babies slept more and ate less. There was no need to build new combs, for little honey could be found in the stray flowers that still bloomed in the garden. One morning, after a frosty night, our bee crawled slowly from

the door and flew toward the marigold bed. The blossoms hung wilted and blackened on bent stems. After hovering over them a moment, she flitted back home.

There was plenty of room inside now, even more than at the time when so many of her sisters had swarmed away following the old queen. Since then the drones had been driven out of the hive, and had died of cold and hunger. The workers knew that they would need all the honey in the combs to keep them alive through the winter. They had none to spare for feeding greedy drones who had never helped gather a grain of pollen or drop of nectar all summer.

Finally winter came in earnest. An icy wind rattled the bare branches of the trees. Snow sifted down over the shrivelled plants in the garden. It covered the earthworm's burrow, and lay deep and soft above the spot where grasshopper eggs were buried. Mosquito wigglers hid in the mud at the bottom of the pond in the meadow. Here

and there in the sheltered crotch of a limb, or rolled within a doubled-up leaf, the cocoons of different kinds of butterflies hung waiting for spring. In the house a few flies crept behind the pictures or slipped into a crack till the warm weather should make them feel like coming out to go again a-buzzing. Spiders slept in their holes or curled up in the middle of thick webs. The ants moved about dully in their underground houses. Within the hive the bees clung together in a great cluster around a comb full of honey.

Our little bee happened to be next to the honey. When she was hungry she sipped a drop and then passed on a mouthful or two to those behind her. From one to another the sweet food travelled till all were fed. When that comb was empty, they moved to the next, crawling over each other. Sometimes our bee was snug in the center, with the many wings around her slowly beating to and fro to keep the air warm. Sometimes she found herself swing-

ing in the outermost row. When too chilly there, she pushed and scrambled farther into the close crowded mass.

Slowly the winter hours dragged on and on and on. Drowsy, barely stirring, half alive, the bees clung together, waiting for spring to bring the flowers in the beautiful garden.

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